Supplementary information

Modulation of Protein-Graphene Oxide Interactions with varying degrees of Oxidation.

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Figure S1: Schematic representation of high energy planetary ball milling process to introduce defects in graphite.
Characterization of GO with varying amounts of defects
Figure S2: Raman spectra (left) and FTIR spectra (right) of different GO samples in different colors.
Figure S3: XRD (left) and ss-NMR spectra (right) of different GO samples shown in different colors.
Figure S4: The Deconvolution of XPS High Resolution C1s Spectra of G\textsubscript{0} (a), G\textsubscript{30} (b), G\textsubscript{80} (c) and G\textsubscript{100} (d).
Figure S5: CD spectra of free ubiquitin and in conjugation with different GO samples.
Figure S6: AFM images of different GO samples (a) G_0, (b) G_30, (c) G_80 and (d) G_100.
### Table S1: List of the various properties of the synthesized GOs.

|                        | G_0   | G_30  | G_80  | G_100 |
|------------------------|-------|-------|-------|-------|
| **Defect density**     | 2.68  | 2.23  | 2.29  | 2.22  |
| **Degree of oxidation**| 64.7  | 94.6  | 87.0  | 95.2  |
| **ζ in mV (in water)** | -4.65 | -34.67| -24.13| -34.23|
| **ζ in mV (in buffer)**| -27.4 | -33.4 | -30.4 | -37.1 |
| **sp²/sp³**            | 0.36  | 0.05  | 0.15  | 0.05  |
| **d-spacing (Å)**      | 9.3   | 9.6   | 9.8   | 9.6   |
| **C/O ratio**          | 1     | 0.55  | 0.88  | 1.03  |

All the GO samples were bath sonicated for 15 mins. When dispersed in water, the samples showed considerable difference in the zeta potential values. While G_0 showed a zeta potential of about -4.65 mV, G_80 showed a potential of -24.13 mV, G_30 and G_100 showed zeta potential of -34.67 and -34.13 respectively. On dispersing the samples in phosphate buffer with pH 6, all the samples exhibited good dispersivity. G_0, G_30, G_80, G_100 showed values of -27.4, -33.4, -30.4 and -37.1 respectively, indicating that all the samples had good colloidal stability at pH 6 considering their zeta potential values when dispersed in water with pH 7; the latter three already were stable as colloidal dispersions in water. The reason behind all the GO showing better stability at pH 6 can be contributed to the factor that pKa of GO lies between 4.3 to 6. Hence, the GO samples are more stable in the comparatively acidic environment.
Figure S7: Reverse titrations. 2D $[^{15}\text{N},^{1}\text{H}]$ HSQC spectra of free ubiquitin (left column) at different concentrations of protein (as indicated on the left) and 2D $[^{15}\text{N},^{1}\text{H}]$ HSQC spectra of GO-Ubq conjugates containing 70 µg/ml each GO (as indicated on the top of each column) at the same protein concentrations as for the free protein.
Theoretical calculation of the amount of bound protein to each GO sample from the reverse titration.

For G_0: taking 27.3 μM the maximum concentration (because after this protein concentration all protein peaks start appearing in the conjugate) that can be bound to G_0:

70 μg/ml of G_0 binds ~ 27.3 μM of Ubq

1 mM of Ubq corresponds to 8.6 mg in 1 ml

Therefore, 27.3 μM of Ubq corresponds to = (8.6/1000) x 27.3 mg = 0.23 mg

Thus, loading capacity of the G_0 is ≈ (0.2/70) mg ≈ 3 μg of protein/μg of G_0.

Similarly,

Loading capacity of the G_30 is ≈ (0.4/70) mg ≈ 5.7 μg of protein/μg of G_30 (taking 44 μM of ubq as max. bound concentration).

Loading capacity of the G_80 is ≈ (0.3/70) mg ≈ 4.3 μg of protein/μg of G_80 (taking 35.7 μM of ubq as max. bound concentration).

Loading capacity of the G_100 is ≈ (0.4/70) mg ≈ 5.7 μg of protein/μg of G_100 (taking 44 μM of ubq as max. bound concentration).
Quantification of the protein loaded onto each GO sample using BCA assay:

The approximate quantification of the protein loaded to each GO was done by using BCA assay. Briefly, the GO samples (70 μg per mL of phosphate buffer at pH 6) were incubated with the ubiquitin for about 20 minutes at room temperature and followed by the centrifugation at 4 °C and 8,000 rpm for 10 minutes, we re-dispersed the GO samples in the BCA assay buffer (50:1 vol ratio of BCA solution and copper sulphate as described earlier1). The respective absorbance values of the GO-protein conjugates were fitted to the following equation to get the final protein bound to each GO:

\[
\text{[protein] in } \mu\text{g} = 0.02634 \times \text{Absorbance} + 0.02255
\]

Which yielded:

Loading capacity of the $G_0$ is $\approx 3.3 \mu\text{g}$ of protein/$\mu\text{g}$ of $G_0$.

Loading capacity of the $G_{30}$ is $\approx 4.4 \mu\text{g}$ of protein/$\mu\text{g}$ of $G_{30}$

Loading capacity of the $G_{80}$ is $\approx 3.8 \mu\text{g}$ of protein/$\mu\text{g}$ of $G_{80}$

Loading capacity of the $G_{100}$ is $\approx 4.6 \mu\text{g}$ of protein/$\mu\text{g}$ of $G_{100}$
The measured $T_2$ ($^1H_N$) values for the free and the $G_0$-bound Ubiquitin at different indicated concentrations of the $G_0$.

| Residue number | Free Ubiquitin | with 38.4 µg/ml | with 56.6 µg/ml | with 74.1 µg/ml | with 90.9 µg/ml | with 107.1 µg/ml |
|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1              |                |                 |                 |                 |                 |                 |
| 2              | 41.4±3.2       | 31.9±1.7        | 31.3±1.6        | 28.8±1.3        | 26.8±1.1        | 23.8±0.8        |
| 3              | 27±1.1         | 21.6±0.6        | 19.9±0.5        | 16.9±0.3        | 16.3±0.3        | 12.4±0.1        |
| 4              | 28.2±1.2       | 22.7±0.7        | 21.9±0.6        | 17.3±0.4        | 13.5±0.2        | 11±0.1          |
| 5              | 41.8±3.2       | 32.6±1.8        | 19.5±0.5        | 19.5±0.5        | 17.7±0.3        | 13.3±0.1        |
| 6              | 36.7±2.4       | 20.5±0.5        | 18.3±0.4        | 17.2±0.3        | 18±0.4          | 12.1±0.1        |
| 7              | 27.2±1.1       | 24±0.8          | 16.9±0.3        | 12.8±0.1        | 9±0             | 9.8±0.1         |
| 8              | 36.5±2.3       | 29.6±1.4        | 27.6±1.2        | 25.8±1          | 25±0.9          | 23.5±0.8        |
| 9              | 22±0.6         | 14.9±0.2        | 10.4±0.1        | 7.8±0           | 2.7±0.3         |                 |
| 10             | 38.8±2.7       | 27.9±1.2        | 25.5±0.9        | 17.6±0.3        | 22.7±0.7        | 20.8±0.5        |
| 11             | 37.4±2.5       | 24.3±0.8        | 22.6±0.7        | 20.5±0.5        | 18.4±0.4        | 16.1±0.3        |
| 12             | 22.3±0.7       | 19.7±0.5        | 17.9±0.4        | 14.6±0.2        | 13.5±0.2        | 12±0.1          |
| 13             | 29.9±1.4       | 23.4±0.7        | 22.4±0.7        | 17±0.9          | 13.8±0.2        | 9.4±0           |
|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 14| 42.1±3.3 | 29.3±1.4 | 27.6±1.2 | 24.6±0.9 | 22.8±0.7 | 19.9±0.5 |
| 15| 36.6±2.3 | 25.2±0.9 | 22.7±0.7 | 19.7±0.5 | 16.5±0.3 | 14.3±0.2 |
| 16| 31.1±1.6 | 25.1±0.9 | 24.1±0.8 | 20±0.5 | 17.2±0.3 | 16.2±0.3 |
| 17| 32.8±1.8 | 25.2±0.9 | 23.8±0.8 | 21.2±0.6 | 19.9±0.5 | 18.5±0.4 |
| 18| 28.2±1.2 | 22.8±0.7 | 21.6±0.6 | 18.7±0.4 | 17.1±0.3 | 15.3±0.2 |
| 19|     |     |     |     |     |     |
| 20| 37.3±2.5 | 27.1±1.1 | 26.3±1 | 25.2±0.9 | 24.6±0.9 | 22.6±0.7 |
| 21| 30.2±1.5 | 25±0.9 | 24.2±0.8 | 23.2±0.7 | 21.7±0.6 | 19.8±0.5 |
| 22| 29.1±1.3 | 24.2±0.8 | 24±0.8 | 22.2±0.7 | 22±0.6 | 15.1±0.2 |
| 23| 28.3±1.2 | 22.8±0.7 | 21.6±0.6 | 17.5±0.3 | 16.4±0.3 | 14.3±0.2 |
| 24|     |     |     |     |     |     |
| 25| 60.3±7.6 | 42.7±3.4 | 39.8±2.9 | 32.9±1.8 | 28±1.2 | 25±0.9 |
| 26| 32.1±1.7 | 25.9±1 | 24.5±0.9 | 21±0.6 | 17.6±0.3 | 16.2±0.3 |
| 27| 29.7±1.4 | 22.9±0.7 | 21.7±0.6 | 20.6±0.5 | 17.9±0.4 | 12.8±0.1 |
| 28| 47.7±4.4 | 36.5±2.3 | 33.6±1.9 | 31.7±1.6 | 28.8±1.3 | 25.7±1 |
| 29| 44±3.7 | 30.7±1.5 | 28.6±1.3 | 26.6±1.1 | 23.8±0.8 | 21.7±0.6 |
| 30| 28.2±1.2 | 22±0.6 | 21.5±0.6 | 19.5±0.5 | 16.8±0.3 | 13.9±0.2 |
| 31| 34.3±2 | 27.7±1.2 | 26.1±1 | 23±0.7 | 22.4±0.7 | 20.4±0.5 |
| 32| 40.1±2.9 | 28.5±1.3 | 27.4±1.1 | 18.9±0.4 | 24.5±0.8 | 21.7±0.6 |
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 33 | 34.3±2 | 30.2±1.5 | 24.3±0.8 | 23.3±0.7 | 20.3±0.5 | 18.6±0.4 |
| 34 | 24.7±0.9 | 19.3±0.4 | 15.6±0.2 | 13.8±0.2 | 12.6±0.1 | 8.5±0 |
| 35 | 80.5±14 | 55.6±6.3 | 49.9±4.9 | 45.1±3.9 | 36.2±2.3 | 30.1±1.5 |
| 36 | 32.9±1.8 | 23.3±0.7 | 22.1±0.6 | 21.4±0.6 | 20.3±0.5 | 18.9±0.4 |
| 37 |   |   |   |   |   |   |
| 38 |   |   |   |   |   |   |
| 39 | 69.4±10 | 54.2±5.9 | 53.2±5.7 | 49±4.7 | 48.2±4.5 | 44.4±3.7 |
| 40 | 30.8±1.5 | 27.1±1.1 | 22.8±0.7 | 22.7±0.7 | 16.8±0.3 | 11.1±0.1 |
| 41 | 31.6±1.6 | 24.6±0.9 | 23.3±0.7 | 17.8±0.3 | 16.1±0.3 | 12.9±0.1 |
| 42 | 25.7±1 | 20.3±0.5 | 18.5±0.4 | 17±0.3 | 15.9±0.3 | 15.3±0.2 |
| 43 | 16.5±0.3 | 12.7±0.1 | 10.9±0.1 | 8.6±0 | 7.3±0 | 5.8±0 |
| 44 | 23.4±0.8 | 20.8±0.5 | 18.1±0.4 | 16.4±0.3 | 15.6±0.2 | 14.2±0.2 |
| 45 | 22.5±0.7 | 19.8±0.5 | 18±0.4 | 14.3±0.2 | 13.2±0.1 | 7.9±0 |
| 46 | 30.4±1.5 | 21.5±0.6 | 16.3±0.3 | 4.8±0 |   |   |
| 47 | 39.3±2.8 | 28.7±1.3 | 20.9±0.5 | 17.7±0.3 | 15.7±0.2 | 13±0.1 |
| 48 | 50.2±5 | 37.7±2.5 | 35.5±2.2 | 32.8±1.8 | 31.9±1.7 | 31.4±1.6 |
| 49 | 40.2±2.9 | 34.7±2.1 | 32±1.7 | 28.3±1.2 | 25.8±1 | 24.7±0.9 |
| 50 | 30.6±1.5 | 24.5±0.8 | 23.9±0.8 | 21.7±0.6 | 19.7±0.5 | 12.5±0.1 |
| 51 | 28.7±1.3 | 21.4±0.6 | 18.3±0.4 | 17.4±0.3 | 15.7±0.2 | 15.6±0.2 |
|   | 52   | 53   | 54    | 55   | 56    | 57    | 58    | 59    | 60    | 61    | 62    | 63    | 64    | 65    | 66    | 67    | 68    | 69    | 70    |
|---|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|   | 38.7±2.7 | 30.7±1.5 | 29.5±1.4 | 27.3±1.1 | 25.8±1 | 22.6±0.7 | 39.3±2.8 | 30.3±1.5 | 25.3±0.9 | 23.6±0.8 | 20.5±0.5 | 16.1±0.3 | 86.3±17 | 65.6±9.1 | 60.4±7.6 | 60.4±7.6 | 55.7±6.3 | 47.8±4.4 | 36.6±2.4 | 27±1.1 | 25.5±0.9 | 24±0.8 | 22.2±0.6 | 20±0.5 | 28.9±1.3 | 22.3±0.7 | 21±0.6 | 17.8±0.3 | 13.4±0.1 | 11.9±0.1 | 42±3.3 | 29.7±1.4 | 27.7±1.2 | 25±0.9 | 22.8±0.7 | 21.6±0.6 | 28.2±1.2 | 20.2±0.5 | 19.6±0.5 | 17.2±0.3 | 16.4±0.3 | 10.2±0.1 | 31.2±1.6 | 24±0.8 | 22.4±0.7 | 21.7±0.6 | 20.4±0.5 | 19.9±0.5 | 46±4.1 | 35.3±2.2 | 32.5±1.8 | 29.8±1.4 | 26.9±1.1 | 24.5±0.9 | 36.9±2.4 | 26.5±1 | 22.1±0.6 | 19.2±0.4 | 17±0.3 | 13.6±0.2 | 27±1.1 | 23.1±0.7 | 19.7±0.5 | 19.3±0.4 | 18.1±0.4 | 16.2±0.3 | 25.3±0.9 | 19.7±0.5 | 19.3±0.4 | 15.9±0.3 | 6.2±0 | 23.2±0.7 | 16.2±0.3 | 15±0.2 | 13.2±0.1 | 10.8±0.1 | 8.2±0 | 30.3±1.5 | 24.6±0.9 | 20.3±0.5 | 17.9±0.4 | 15.2±0.2 | 12.1±0.1 | 32.1±1.7 | 28.3±1.2 | 23.7±0.8 | 22±0.6 | 20.7±0.5 | 19.7±0.5 | 39.8±2.9 | 24.3±0.8 | 20.7±0.5 | 18±0.4 | 17±0.3 | 12.8±0.1 |
|   |       |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|-------|
| 71| 32.7±1.8 | 25.8±1 | 23.2±0.7 | 20.8±0.5 | 19.5±0.5 | 17.2±0.3 |
| 72| 39.5±2.8 | 30.4±1.5 | 28.1±1.2 | 27.4±1.1 | 25.4±0.9 | 25.1±0.9 |
| 73| 38.92±2.7 | 29.6±1.4 | 27.1±1.1 | 25.6±1 | 25.1±0.9 | 23.1±0.7 |
| 74| 41.14±3.1 | 31.5±1.6 | 29±1.3 | 28.2±1.2 | 26.7±1.1 | 26.1±1 |
| 75| 29.52±1.4 | 23.9±0.8 | 22.3±0.7 | 21.4±0.6 | 20.5±0.5 | 18.8±0.4 |
| 76| 66.84±0.9 | 54±0.9 | 53.9±5.9 | 48.5±4.6 | 45.8±4 | 44.4±3.7 |
The measured $T_2$ ($^1H_N$) values for the free and the G_30-bound Ubiquitin at different indicated concentrations of the G_30.

| Residue number | Free Ubiquitin | with 38.4 µg/ml | with 56.6 µg/ml | with 74.1 µg/ml | with 90.9 µg/ml | with 107.1 µg/ml |
|----------------|----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| 1              |                |                 |                 |                 |                 |                  |
| 2              | 41.4±3.2       | 29.8±3.1        | 28.9±1.4        | 27.1±2.9        | 25.7±0.6        | 22.3±0.1         |
| 3              | 27±1.1         | 20.9±1.8        | 16.4±0.4        | 15.4±0.6        | 11.3±0.1        | 7.4±0.8          |
| 4              | 28.2±1.2       | 19.9±2          | 19.3±0.9        | 18.3±0.2        | 18.2±0.2        | 17.9±0.1         |
| 5              | 41.8±3.2       | 29.2±1.6        | 26.7±1.6        | 21.3±0.2        | 18±0.4          | 16.3±0.6         |
| 6              | 36.7±2.4       | 24.6±0.6        | 20.8±0.5        | 12.6±0.2        | 8.5±0.2         |                  |
| 7              | 27.2±1.1       | 20.5±0.9        | 17.2±0.1        | 15.3±0.3        | 12.3±0.2        | 6.1±0.1          |
| 8              | 36.5±2.3       | 25.5±1.5        | 22.7±0          | 21.2±1          | 20±0.2          | 19.7±1           |
| 9              | 22±0.6         | 15.4±1.8        | 14.3±0.2        | 7.3±0.3         | 6.4±0.3         |                  |
| 10             | 38.8±2.7       | 25.2±2.4        | 22.9±0.2        | 16.7±0.3        | 9.1±0.3         | 4.6±0.2          |
|   | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 11 | 37.4±2.5 | 25.8±1.1 | 20.9±0.3 | 16.8±0.2 | 14.9±0.2 | 12.3±0.3 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 29.9±1.4 | 19.5±2.4 | 16.2±0.1 | 7.2±0.2 | 3.3±0.2 | 42.1±3.3 | 29.9±2.2 | 26.1±0.7 | 24±0.6 | 18.9±0.2 | 18.4±0.6 | 36.6±2.3 | 27.8±1.1 | 21.2±1 | 15.4±0.1 | 9.5±0.3 | 31.1±1.6 | 24.6±2.7 | 22.1±0.2 | 20.5±0.4 | 18.4±0.2 | 16.2±0.3 | 32.8±1.8 | 23.3±2.2 | 21.7±0.4 | 17.1±0.3 | 15.8±0.2 |
| 12 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 | 22.3±0.7 | 16.3±4.4 | 15.2±0.8 | 10.9±0.4 | 10.8±0.3 | 8.3±0.6 |
|   | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |
|---|----|----|----|----|----|----|----|----|----|----|
|   | 44±3.7 | 36.2±0.6 | 30.4±1.1 | 25.5±1 | 20.7±1 | 9.8±0.1 | | | | |
|   | 28.2±1.2 | 22±2 | 19.5±1.1 | 17.5±0.7 | 13.6±0.2 | 10.4±0.6 | | | | |
|   | 34.3±2 | 25.4±0.6 | 20.9±0.4 | 18.5±0.1 | 15.8±0.5 | 12.7±0.6 | | | | |
|   | 40.1±2.9 | 30.9±1.5 | 28.9±3.2 | 26.5±0.4 | 20.5±0.2 | 18.9±1 | | | | |
|   | 34.3±2 | 24.7±0.3 | 24±1.6 | 21.2±0 | 18.2±0.6 | 13±0.2 | | | | |
|   | 24.7±0.9 | 14±0.5 | 9±0.3 | 6.4±0.3 | 3.6±0.1 | 3±0.5 | | | | |
|   | 80.5±14 | 46.1±0.7 | 41.6±2.5 | 36.6±3 | 10.8±0.7 | | | | | |
|   | 32.9±1.8 | 23.7±0.3 | 20.1±0.4 | 17.5±0.6 | 12.7±0.3 | 4±0.7 | | | | |
|   | 69.4±10 | 55.2±0.3 | 45.1±2.4 | 36.1±0.3 | 31.9±4.5 | 25.7±0.6 | | | | |
|   | 30.8±1.5 | 21.3±0.1 | 17.9±1 | 15.7±0.2 | 12.6±0.5 | 10.5±0.1 | | | | |
|   | 31.6±1.6 | 23.4±0.6 | 19.3±0.4 | 15.5±0.4 | 13.3±0.1 | 11.4±0.2 | | | | |
|   | 25.7±1 | 17.3±0.6 | 17.2±0.5 | 12.7±0.6 | 11.6±0.2 | 8.2±0.5 | | | | |
|   | 16.5±0.3 | 9.4±0.5 | 7.7±0.7 | 2.3±0.2 | | | | | | |
|   | 23.4±0.8 | 17.1±0.4 | 16.2±0.1 | 14.5±0.7 | 14±0.2 | 12.6±0.9 | | | | |
|   | 22.5±0.7 | 15±0.5 | 12.8±0.6 | 10.1±0.2 | 5.2±0.2 | | | | | |
|   | 30.4±1.5 | 20.4±0.5 | 13.9±0.3 | | | | | | | |
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 47 | 39.3±2.8 | 30.3±0.1 | 27.4±1.3 | 25.1±1.4 | 23±1.1 | 20.9±0.6 |
| 48 | 50.2±5   | 40.7±4.7 | 39.6±2.5 | 38.5±1.4 | 33±0.3 | 32.4±1.9 |
| 49 | 40.2±2.9 | 32.4±4.5 | 31.6±2.4 | 30±0.8  | 27.1±0.6 | 25.6±1.4 |
| 50 | 30.6±1.5 | 20.8±0.8 | 15.6±1.7 | 10.6±0.3 | 7.2±0.4 |
| 51 | 28.7±1.3 | 19.4±0.6 | 18.4±1.6 | 12.4±0.3 | 11.9±0.7 |
| 52 | 38.7±2.7 | 30.2±2   | 26.7±1.1 | 24.8±0   | 19.8±1.7 | 16.7±0.3 |
| 53 |   |   |   |   |   |
| 54 | 29.6±1.4 | 23.1±2   | 19.9±0.5 | 15.4±0.3 | 14.2±0.2 | 10.7±0.2 |
| 55 | 22.9±0.7 | 16.5±3.2 | 13.9±0.4 | 8.2±0.2  | 7.1±0.1 |
| 56 | 39.3±2.8 | 31.5±3.6 | 27.1±1.1 | 21.2±0.1 | 19.3±0.4 | 14.6±0.6 |
| 57 | 86.3±17  | 66.4±14.8| 58.4±6.6 | 53.1±5.4 | 47±0.1  | 42.6±5.6 |
| 58 | 36.6±2.4 | 27.1±0.6 | 26±2.2  | 24.9±0.8 | 21±0.7  | 20.8±0.5 |
| 59 | 28.9±1.3 | 19.7±0.8 | 18.5±1.6 | 16.2±0.3 | 11.7±0.3 | 9.3±0.7 |
| 60 | 42±3.3   | 27.9±4.2 | 25.6±0.4 | 19.3±0.5 | 16.1±0.3 |
| 61 | 28.2±1.2 | 19.5±1.1 | 18.1±0.2 | 15.2±0.1 | 13.9±0.5 | 10.7±0.2 |
| 62 | 31.2±1.6 | 20.3±2.3 | 16.2±0.3 | 15.6±0.9 | 13.1±0.1 | 9.4±0.2 |
| 63 | 46±4.1   | 35.5±1.5 | 30.4±3.5 | 23.9±0.3 | 21.6±1  | 18±0.6 |
| 64 | 36.9±2.4 | 23.1±0.9 | 20.7±3.5 | 13.5±0.4 | 9±0.4  |
|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 65| 27±1.1 | 21±2 | 17.8±3.5 | 15.9±1.6 | 12.5±0.6 | 11.2±0.8 |
| 66| 25.3±0.9 | 16.7±3.5 | 14.7±1 | 11.4±0.2 | 9.2±0.3 | 8.1±0.7 |
| 67| 23.2±0.7 | 15±2.1 | 13.3±0.6 | 5.6±0.4 |     |     |
| 68| 30.3±1.5 | 20.3±5.3 | 17.1±0.4 | 13.8±0.3 | 7.2±0.1 |     |
| 69| 32.1±1.7 | 22.6±1.8 | 19.6±0.4 | 17.6±0.2 | 15.8±0.5 | 14±0.7 |
| 70| 39.8±2.9 | 20.3±1.6 | 16.2±0.4 | 12.3±0.7 | 5.1±0.1 |     |
| 71| 32.7±1.8 | 25.5±2 | 21.3±2.4 | 17±0.3 | 16.1±0.5 | 14.2±0.5 |
| 72| 39.5±2.8 | 28.6±3.6 | 24.5±0.7 | 23.7±2.6 | 21.7±1.8 | 20.3±2.2 |
| 73| 38.92±2.7 | 27.8±2.7 | 24.1±6.5 | 23.1±2 | 21.1±1.1 | 20.9±9.6 |
| 74| 41.14±3.1 | 32.1±2 | 29.6±3.2 | 29.1±2 | 28.6±1.4 | 26.7±2.3 |
| 75| 29.52±1.4 | 22.7±1.5 | 20.6±1.4 | 19.5±0.3 | 17.3±1.4 | 15.8±0.8 |
| 76| 66.84±0.9 | 53.5±3.6 | 50.8±1.1 | 50.7±8.5 | 47.2±2 | 45.8±0.9 |
The measured $T_2$ ($^1H_N$) values for the free and the G_80-bound Ubiquitin at different indicated concentrations of the G_80.

| Residue number | Free Ubiquitin | with 38.4 µg/ml | with 56.6 µg/ml | with 74.1 µg/ml | with 90.9 µg/ml | with 107.1 µg/ml |
|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1              |                |                 |                 |                 |                 |                 |
| 2              | 41.4±3.2       | 29.8±0.3        | 27.4±0.4        | 22.4±0.1        | 14.3±0.2        | 5.8±0.2         |
| 3              | 27±1.1         | 20.5±0.1        | 16.7±0.7        | 15.6±1          | 12.7±1          | 7.4±0.9         |
| 4              | 28.2±1.2       | 22±0.2          | 18.6±0.4        | 16.1±0.6        | 12.1±0.3        | 10.4±0.6        |
| 5              | 41.8±3.2       | 30.1±0.3        | 23.8±0.6        | 20.1±0.2        | 16.3±0.6        | 13.8±0.3        |
| 6              | 36.7±2.4       | 30.1±0.6        | 24.6±0.5        | 19.1±0.3        | 16.5±0.2        | 5±1             |
| 7              | 27.2±1.1       | 21.2±0.2        | 18.8±0.1        | 16.3±0.3        | 15.3±0.3        | 11.3±0.9        |
| 8              | 36.5±2.3       | 28.5±0.2        | 25.2±0.1        | 20.8±0.6        | 16.4±0.2        | 10.2±0.3        |
| 9              | 22±0.6         | 15.2±0.1        | 11±0.9          | 10.6±0.2        | 7±0.5           | 4±0.2           |
| 10             | 38.8±2.7       | 30.3±0.2        | 24.1±0.7        | 19.8±0.2        | 12±0.1          | 6.6±0.1         |
| 11             | 37.4±2.5       | 26.2±0.2        | 25.4±0.8        | 20.2±0.1        | 17.2±0.5        | 15.5±0.7        |
| 12             | 22.3±0.7       | 17.4±0.2        | 15±0.5          | 12.7±0.6        | 11.4±0.2        | 10±0.1          |
|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 13 | 29.9±1.4 | 22.8±0.1 | 20.4±0.8 | 18.6±0.7 | 14.7±0.4 | 9.3±0.1 |
| 14 | 42.1±3.3 | 30.3±0.3 | 27.8±0.4 | 22.7±0.1 | 18.9±0.2 | 11.9±0.7 |
| 15 | 36.6±2.3 | 28.9±0.3 | 17.5±0.2 | 14.3±0.6 | 10.6±0.3 | 6.6±0.2 |
| 16 | 31.1±1.6 | 25.8±0.8 | 22.1±0.2 | 19.6±0.1 | 17.4±0.3 | 17±0.2 |
| 17 | 32.8±1.8 | 25.6±0.2 | 21.3±0.2 | 19±1 | 16.1±0.4 | 12.6±0.3 |
| 18 | 28.2±1.2 | 23.3±0.8 | 23±0.6 | 20.4±0.4 | 19.8±0.2 | 17.9±0.1 |
| 19 |   |   |   |   |   |   |
| 20 | 37.3±2.5 | 29.7±0.3 | 27.1±0.4 | 23.1±0.7 | 20.5±0.2 | 16±0.3 |
| 21 | 30.2±1.5 | 24.1±0.3 | 23.1±0.1 | 21.6±0.3 | 19.5±0.2 | 18.5±0.5 |
| 22 | 29.1±1.3 | 23.5±0.4 | 22.3±0.1 | 19±0.3 | 15.9±0.2 | 14.9±0.2 |
| 23 | 28.3±1.2 | 22.1±0.2 | 18.1±0.2 | 14.7±0.3 | 12.2±0.3 | 8.8±0.1 |
| 24 |   |   |   |   |   |   |
| 25 | 60.3±7.6 | 45.9±0.1 | 39.8±0.4 | 32.6±0.1 | 26±0.3 | 24.4±0.3 |
| 26 | 32.1±1.7 | 26.3±0.6 | 22.3±0.1 | 21.1±0.3 | 19.7±0.5 | 17.1±0.7 |
| 27 | 29.7±1.4 | 21.9±0.6 | 20.7±0.1 | 20.4±0.9 | 18.6±0.8 | 15.9±0.9 |
| 28 | 47.7±4.4 | 33.8±0.2 | 30±0.1 | 29.3±0.5 | 27.3±0.6 | 25.3±0.6 |
| 29 | 44±3.7 | 32.6±0.6 | 28.2±0.2 | 25.1±0.6 | 21.6±0.4 | 19.4±0.9 |
| 30 | 28.2±1.2 | 23.1±0.6 | 18.9±0.5 | 14.1±0.9 | 13±0.5 | 10.2±0.3 |
| No | Value 1 ± Error 1 | Value 2 ± Error 2 | Value 3 ± Error 3 | Value 4 ± Error 4 | Value 5 ± Error 5 |
|----|-------------------|-------------------|-------------------|-------------------|-------------------|
| 31 | 34.3±2            | 25.1±0.4          | 22±0.2            | 20.9±0.4          | 18.5±0.1          | 14.8±0.3          |
| 32 | 40.1±2.9          | 27.7±0.1          | 24.9±0.7          | 22.5±0.3          | 18.1±0.2          | 15±0.9            |
| 33 | 34.3±2            | 23.6±0.1          | 20.6±0.3          | 18.5±0.1          | 16.5±0.2          | 12.7±0.6          |
| 34 | 24.7±0.9          | 19±0.2            | 15.8±0.2          | 11.3±0.3          | 6±0.4             | 2.3±0.2           |
| 35 | 80.5±14           | 55.6±0.1          | 50.7±0.1          | 43.5±0.1          | 36.2±0.2          | 25.8±0.5          |
| 36 | 32.9±1.8          | 25.4±0.2          | 21.4±0.2          | 16.8±0.2          | 15.1±0.5          | 12.5±0.2          |
| 37 |                   |                   |                   |                   |                   |                   |
| 38 |                   |                   |                   |                   |                   |                   |
| 39 | 69.4±10           | 50±0.3            | 48.3±0.1          | 45.4±0.3          | 40.6±0.1          | 37.1±0.8          |
| 40 | 30.8±1.5          | 21±0.8            | 19.4±0.1          | 16±0.3            | 13.9±0.2          | 12±0.6            |
| 41 | 31.6±1.6          | 23±0.4            | 17.4±0.2          | 15.2±0.2          | 14.5±0.5          | 11.4±0.2          |
| 42 | 25.7±1            | 20.1±0.2          | 15.7±0.4          | 14.4±0.3          | 11.6±0.2          | 9.6±0.8           |
| 43 | 16.5±0.3          | 11.4±0.1          | 8.8±0.6           | 7.8±1             | 4.6±0.3           |                   |
| 44 | 23.4±0.8          | 17.8±0.1          | 14.8±0.1          | 13.4±0.6          | 10.8±0.5          | 5.5±0.6           |
| 45 | 22.5±0.7          | 15.2±0.7          | 13.4±0.2          | 12.6±0.4          | 7.9±0.7           | 0.4±0             |
| 46 | 30.4±1.5          | 20.5±0.6          | 14±0.5            | 13.1±0.3          | 8.5±0.3           |                   |
| 47 | 39.3±2.8          | 30.7±0.2          | 27.2±0.1          | 25.2±0.2          | 21.2±0.1          | 15.7±0.2          |
| 48 | 50.2±5            | 39.2±0.2          | 36±0.3            | 33.1±0.3          | 30.9±0.5          | 26.8±0.7          |
|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 49| 40.2±2.9 | 28.9±0.3 | 24.1±0.3 | 21.3±0.6 | 16.1±0.2 | 14.1±0.5 |
| 50| 30.6±1.5 | 22±0.3 | 19.9±0.2 | 15.8±0.2 | 10.5±0.2 | 4.1±0.3 |
| 51| 28.7±1.3 | 23.2±0.4 | 22±0.1 | 21.6±0.9 | 20.3±0.2 | 18.6±0.2 |
| 52| 38.7±2.7 | 28.3±0.4 | 26.3±0.8 | 21.7±0.3 | 19.9±0.2 | 16.7±0.4 |
| 53|     |     |     |     |     |     |
| 54| 29.6±1.4 | 22.5±0.1 | 19.6±0.4 | 15.7±0.6 | 13.6±0.5 | 9.4±0.3 |
| 55| 22.9±0.7 | 17.6±0.2 | 14.6±0.2 | 11±0.2 | 7.3±0.5 | 6.4±0.3 |
| 56| 39.3±2.8 | 29.9±0.1 | 26±0.4 | 22±0.3 | 17.7±0.2 | 12.6±0.5 |
| 57| 86.3±17 | 67.3±0.2 | 65.7±0.1 | 60±0.1 | 55.8±0.2 | 46.3±0.9 |
| 58| 36.6±2.4 | 24.9±0.8 | 21.6±0.2 | 18.7±0.2 | 16.9±0.5 | 12.8±0.5 |
| 59| 28.9±1.3 | 21.4±0.6 | 18.8±0.2 | 14.2±0.4 | 10.7±0.6 | 3.5±0.2 |
| 60| 42±3.3 | 31.9±0.1 | 27.3±0.2 | 22.7±0.1 | 20.6±0.4 | 11.9±0.5 |
| 61| 28.2±1.2 | 21.5±0.1 | 17.8±0.1 | 15.5±0.2 | 13±0.5 | 8.6±0.3 |
| 62| 31.2±1.6 | 22.8±0.4 | 21.5±0.1 | 19±0.4 | 12.8±0.5 | 10.9±0.5 |
| 63| 46±4.1 | 34.1±0.6 | 30.4±0.4 | 26.7±1 | 23.7±0.2 | 19.9±0.4 |
| 64| 36.9±2.4 | 26.2±0.2 | 23.6±0.2 | 20.3±0.2 | 15.9±0.3 | 5.6±0.1 |
| 65| 27±1.1 | 21.8±0.5 | 18.9±0.2 | 17.3±0.2 | 15.4±0.6 | 11.3±0.1 |
| 66| 25.3±0.9 | 18.2±0.3 | 16.4±0.2 | 14.9±0.2 | 11.3±0.2 | 7.2±0.6 |
|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 67 | 23.2±0.7 | 17.8±0.2 | 15.3±0.4 | 8.2±0.8 | 3.7±0.3 | 2.8±0.2 |
| 68 | 30.3±1.5 | 23.3±0.2 | 19.1±0.1 | 17±0.3 | 14.8±0.4 | 4.3±0.2 |
| 69 | 32.1±1.7 | 26.3±0.6 | 22.8±0.2 | 21.8±0.1 | 20.6±0.2 | 15.2±0.1 |
| 70 | 39.8±2.9 | 29.8±0.8 | 25.5±0.2 | 21.1±0.1 | 18.7±1 | 8.1±0.5 |
| 71 | 32.7±1.8 | 25.8±0.3 | 25±0.1 | 23.4±0.3 | 21.2±0.2 | 20.8±0.1 |
| 72 | 39.5±2.8 | 30±0.1 | 26.4±0.5 | 24.5±0.7 | 20.9±0.6 | 19.5±0.6 |
| 73 | 38.92±2.7 | 30.4±0.2 | 27.9±0.3 | 25.5±0.3 | 25.1±0.2 | 20.7±0.7 |
| 74 | 41.14±3.1 | 34.5±1 | 31.5±0.1 | 30.3±0.5 | 26.7±0.2 | 25.3±0.5 |
| 75 | 29.52±1.4 | 20.1±0.8 | 19.8±0.5 | 17.1±1 | 16.1±0.2 | 14.9±0.1 |
| 76 | 66.84±0.9 | 54±0.4 | 51.4±0.1 | 47.9±0.3 | 46.5±0.1 | 43.5±0.2 |
The measured $T_2^{(1H_N)}$ values for the free and the G_100-bound Ubiquitin at different indicated concentrations of the G_100.

| Residue number | Free Ubiquitin with 38.4 µg/ml | G_100 with 38.4 µg/ml | G_100 with 56.6 µg/ml | G_100 with 74.1 µg/ml | G_100 with 90.9 µg/ml | G_100 with 107.1 µg/ml |
|----------------|-------------------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 1              |                               |                      |                       |                       |                       |                        |
| 2              | 41.4±3.2                      | 28.9±0.1             | 23.8±0.7              | 16.8±0.4              | 12.3±0.8              | 10.4±0.3               |
| 3              | 27±1.1                        | 21±0.2               | 19.1±0.2              | 17.8±0.4              | 15.6±1                | 5.4±0.2                |
| 4              | 28.2±1.2                      | 22±0.2               | 19.5±0.1              | 18.6±0.4              | 16.9±0.3              | 7.3±0.4                |
| 5              | 41.8±3.2                      | 30.5±0.4             | 26.6±0.1              | 22.1±0.6              | 18.4±0.9              | 4.2±0.9                |
| 6              | 36.7±2.4                      | 22.5±0.5             | 19.4±0.6              | 16.1±0.9              | 12.9±0.7              | 0±0                    |
| 7              | 27.2±1.1                      | 20.2±0.6             | 18.5±0.8              | 15.3±0.3              | 11.7±0.4              | 6.8±0.3                |
| 8              | 36.5±2.3                      | 24.6±0.6             | 22.7±0.7              | 20.5±0.3              | 15.4±0.1              | 4±0.2                  |
| 9              | 22±0.6                        | 15.2±0.1             | 12.1±0.2              | 10.6±0.2              | 8.8±0.2               | 0±0                    |
| 10             | 38.8±2.7                      | 30.3±0.2             | 24.8±0.2              | 21.3±0.2              | 14±0.2                | 7.4±0.3                |
| 11             | 37.4±2.5                      | 28.4±0.1             | 23.6±0.1              | 20.9±0.3              | 16.1±0.4              | 12.7±0.1               |
|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
|12 | 22.3±0.7 | 17.2±0.2 | 15.4±0.1 | 14.3±0.2 | 11.4±0.2 | 8.9±0.2 |
|13 | 29.9±1.4 | 23.4±0.2 | 21.3±0.2 | 19.8±0.4 | 15.4±0.2 | 6±0.2  |
|14 | 42.1±3.3 | 32±0.1  | 29±0.1  | 26.1±0.7 | 19.4±0.5 | 14.3±0.1|
|15 | 36.6±2.3 | 26.3±0.3 | 23.4±0.2 | 19.4±0.6 | 16.8±0.5 | 3.3±0.1|
|16 | 31.1±1.6 | 23.3±0.8 | 21.5±0.1 | 19.6±0.1 | 17.4±0.3 | 15.6±0.9|
|17 | 32.8±1.8 | 25.6±0.2 | 20.3±0.7 | 18.1±0.2 | 15±0.4  | 11.2±0.1|
|18 | 28.2±1.2 | 21.5±0.1 | 18±0.2  | 16.6±0.2 | 11.5±0.4 | 10.4±0.6|
|19 | 0±0     | 0±0     | 0±0     | 0±0     | 0±0     | 0±0    |
|20 | 37.3±2.5 | 27.6±0.6 | 24.6±0.4 | 20.1±0.1 | 17.9±0.2 | 14.9±0.2|
|21 | 30.2±1.5 | 23.2±0.2 | 19.3±0.2 | 17.5±1  | 14.3±0.1 | 11.8±0.6|
|22 | 29.1±1.3 | 23±0.3   | 20.4±0.2 | 18.8±0.2 | 16.3±0.3 | 15.1±0.3|
|23 | 28.3±1.2 | 20.4±0.3 | 18.4±0.2 | 15±0.6  | 12.4±0.9 | 9.1±0  |
|24 | 0±0     | 0±0     | 0±0     | 0±0     | 0±0     | 0±0    |
|25 | 60.3±7.6 | 41.6±0.1 | 36.8±0.4 | 32±0.6  | 27.8±0.5 | 22.3±0.6|
|26 | 32.1±1.7 | 22.9±0.3 | 21.2±0   | 17.3±0.1 | 15.1±1  | 12.2±0.2|
|27 | 29.7±1.4 | 23.2±0.2 | 21.3±0.3 | 19.3±0.2 | 13.1±0.9 | 4.8±0.3|
|28 | 47.7±4.4 | 36.2±0.1 | 31.5±0.4 | 26.7±0.3 | 21.5±0.2 | 19.1±0.2|
|29 | 44±3.7   | 34±0.2   | 27.5±0.8 | 24.7±0.3 | 19.8±0.2 | 12.3±0.3|
|30 | 28.2±1.2 | 22±0.2   | 18.6±0.4 | 15.2±0.1 | 13.8±0.4 | 10.7±0.2|
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 31 | 34.3±2 | 26.4±0.2 | 23.7±0.1 | 21.3±0.7 | 17.5±0.2 | 16.5±0.2 |
| 32 | 40.1±2.9 | 32.5±0.5 | 29.7±0.6 | 27.3±0.8 | 23.7±0.2 | 20.1±0.9 |
| 33 | 34.3±2 | 26±0.1 | 21.6±0.1 | 19.9±1 | 18.8±0.2 | 13.4±0.6 |
| 34 | 24.7±0.9 | 18.8±0.1 | 15.3±0.7 | 13.2±0.7 | 11.9±0.2 | 2.7±0.2 |
| 35 | 80.5±14 | 58±0.3 | 61.2±0.1 | 45.1±0.3 | 29.8±0.6 | 11.3±0 |
| 36 | 32.9±1.8 | 23.4±0.2 | 22.4±0.8 | 20.7±0.1 | 18.8±0.6 | 15.1±0.5 |
| 37 |   |   |   |   |   |   |
| 38 |   |   |   |   |   |   |
| 39 | 69.4±10 | 54.2±0.2 | 48.6±0.2 | 46.5±0.5 | 40.3±1 | 34.7±0.9 |
| 40 | 30.8±1.5 | 23.7±0.2 | 21.3±0.1 | 20.3±0.4 | 15.7±0.2 | 12.3±0.2 |
| 41 | 31.6±1.6 | 24.3±0.2 | 20.8±0.4 | 16.4±0.3 | 14.5±0.5 | 11±0.5 |
| 42 | 25.7±1 | 19.5±0.1 | 17.2±0.5 | 15.2±0.2 | 12.6±0.4 | 11.3±0.9 |
| 43 | 16.5±0.3 | 12.4±0.8 | 10.9±0.4 | 8.4±0.2 | 5±0.2 |   |
| 44 | 23.4±0.8 | 19±0.5 | 16.9±0.3 | 14.8±0.1 | 11.5±0.4 | 7±0.2 |
| 45 | 22.5±0.7 | 16.2±0.3 | 13.2±0.2 | 9.4±0.1 | 7±0.1 | 4±0.2 |
| 46 | 30.4±1.5 | 23.9±0.3 | 20.1±0.4 | 16.9±0.3 | 10.6±0.3 | 0±0 |
| 47 | 39.3±2.8 | 30.3±0.2 | 25.6±0.2 | 20.1±0.2 | 17.7±0.2 | 11.4±0 |
| 48 | 50.2±5 | 40.7±0.5 | 38.7±0.2 | 38.7±0.2 | 35.7±0.2 | 33.7±0.5 |
| 49 | 40.2±2.9 | 31.7±0.3 | 24.5±0.4 | 21.7±0.1 | 18.9±1 | 12.9±0.5 |
|   |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|
| 50| 30.6±1.5 | 21.7±0.2 | 19.6±0.2 | 14.4±1 | 8.9±0.3 | 3.4±0.2 |
| 51| 28.7±1.3 | 22.1±0.2 | 19.3±0.5 | 14.9±0.3 | 12.6±0.9 | 10.6±0.6 |
| 52| 38.7±2.7 | 27.5±0.2 | 26.7±0.1 | 22.9±0.2 | 17±0.9 | 14.7±0.2 |
| 53|     |     |     |     |     |     |
| 54| 29.6±1.4 | 22.8±0.2 | 18.7±0.1 | 16.3±0.2 | 12.7±0.4 | 10.4±0.5 |
| 55| 22.9±0.7 | 17.8±0.2 | 15.3±0.5 | 12.6±0.2 | 7.3±0.5 |     |
| 56| 39.3±2.8 | 27.9±0.2 | 24.6±0.8 | 21.5±0.2 | 18.1±0.5 | 13.8±0.5 |
| 57| 86.3±17 | 66.4±0.2 | 57.8±0.5 | 45.7±0.6 | 32.8±0.2 | 27.6±0.5 |
| 58| 36.6±2.4 | 28.6±0.2 | 23.8±0.2 | 20.5±0.3 | 15.8±0.4 | 10±0.6 |
| 59| 28.9±1.3 | 19.7±0.9 | 18.7±0.2 | 16.5±0.5 | 12.6±0.6 | 4.5±1 |
| 60| 42±3.3 | 27.2±0.2 | 24.4±1 | 18.1±0.4 | 9.8±0.2 | 7.1±0.1 |
| 61| 28.2±1.2 | 23.1±0.6 | 18.6±0.3 | 16±0.5 | 13±0.4 | 8±0.9 |
| 62| 31.2±1.6 | 24.3±0.2 | 22.8±0.4 | 20.9±0.5 | 17.1±0.2 | 11.2±0.2 |
| 63| 46±4.1 | 34.5±0.8 | 30.4±0.4 | 26.7±1 | 21±0.3 | 17±0.6 |
| 64| 36.9±2.4 | 28.8±0.2 | 24.9±0.7 | 19.5±0.6 | 16.2±0.9 | 6.7±0.7 |
| 65| 27±1.1 | 21±0.2 | 19.1±0.2 | 17.5±0.2 | 13.8±0.2 | 11.9±0.9 |
| 66| 25.3±0.9 | 19.5±0.2 | 16.4±0.2 | 13.7±0.1 | 10.6±0.1 | 3±0.5 |
| 67| 23.2±0.7 | 16.9±0.4 | 15.5±0.5 | 12.8±0.2 | 8.6±0.6 | 4.2±0 |
| 68| 30.3±1.5 | 23.6±0.2 | 18.5±0.4 | 15.7±0.3 | 11.5±0.2 | 3.7±0.4 |
|    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|
| 69 | 32.1±1.7 | 23.4±0.4 | 21.5±0.5 | 18±0.3 | 13.8±0.4 | 11.9±0.6 |
| 70 | 39.8±2.9 | 26.7±0.5 | 21.5±0.1 | 12.7±0.5 | 10.3±0.4 | 4.4±0.2 |
| 71 | 32.7±1.8 | 25.5±0.2 | 23.2±0.2 | 23.2±0.2 | 20.3±0.7 | 17.7±0.1 |
| 72 | 39.5±2.8 | 31.2±0.3 | 24.9±0.1 | 22.5±0.6 | 18.2±0.5 | 15±0.2 |
| 73 | 38.92±2.7 | 31.9±0.6 | 29.6±0.1 | 24.5±0.1 | 19.1±0.4 | 15.6±0.2 |
| 74 | 41.14±3.1 | 32.5±0.3 | 31.7±0.2 | 27.6±0.5 | 22.2±0.1 | 17.7±0.4 |
| 75 | 29.52±1.4 | 23.9±0.5 | 20.7±0.2 | 19.8±0.5 | 17.4±0.2 | 14.8±0.9 |
| 76 | 66.84±0.9 | 56.9±0.1 | 55.3±0.8 | 54.7±0.6 | 54±0.5 | 51.7±0.2 |

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