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Figure 1: Top: NMR spectra from a JA/Brij NP, inset shows JA fingerprint peak. Bottom: Representative spectra from: 1) Kol/Plu, 2) Kol/Brij, 3) JA/Brij, 4) JA/SDS.
**Figure 2:** Reference NMR spectra from: 1) SDS, 2) JA, 3) Brij 4) Kol, 5) Plu, 6) Miglyol 810N, 7) PBCA NP without PEG.
Table 1: Constants, units and variables used for PEG density calculations.

| Constants          | Abbreviation | Value | Unit |
|--------------------|--------------|-------|------|
| MW BCA-mon         | MW_{BCA}     | 153   | Da   |
| MW PEG-mon         | MW_{PEG}     | 44    | Da   |
| MW miglyol         | MW_{mig}     | 512   | Da   |
| Density polymer    | \( \rho \)   | 1.148 | g/ml |
| Integral BCA       | \( I_{BCA} \) | 1     |      |
| Ratio PEG-CH2 vs. BCA CH2 | \( R_{PEG} \) | 2     |      |
| Ratio Miglyol vs BCA CH2 | \( R_{mig} \) | 3     |      |
| Avogadros constant | \( N_A \)    | 6.02x10^{23} | mol\(^{-1} \) |

| Measurable variables | Abbreviation | Unit |
|----------------------|--------------|------|
| Dry weight polymer   | \( W_{dry} \) | mg/L |
| Integral PEG         | \( I_{PEG} \) |       |
| Integral miglyol     | \( I_{mig} \) |       |
| Radius NP            | \( r \)      | nm   |

| Calculated variables | Abbreviation | Unit |
|----------------------|--------------|------|
| mol fraction PEG     | \( \text{molFr}_{peg} \) |       |
| mol fraction miglyol | \( \text{molFr}_{mig} \) |       |
| mol fraction BCA     | \( \text{molFr}_{BCA} \) |       |
| weight fraction PEG  | \( \text{weightFr}_{PEG} \) |       |
| weight fraction miglyol | \( \text{weightFr}_{mig} \) |       |
| conc PEG in batch    | \( C_{PEG} \) | M    |
| conc miglyol in batch| \( C_{mig} \) | M    |
| Volume NP            | \( V_{NP} \) | mL   |
| Weight NP            | \( W_{NP} \) | g/NP |
| # NP in batch        | \( N_{NP} \) | NP/mL|
| Area NP              | \( A_{NP} \) | nm\(^{2}/NP \) |
| # PEG on NP          | \( N_{PEG/NP} \) | # PEG/NP |
| # coverage           | \( N_{PEG/Area} \) | # PEG/nm\(^{2} \) |
Equations 1-14:

\[
\text{molFr}_{\text{PEG}} = \frac{I_{\text{PEG}}}{I_{\text{PEG}} + I_{\text{mig}} + I_{\text{BCA}}} \cdot R^{-1}_{\text{mig}} \tag{1}
\]

\[
\text{molFr}_{\text{mig}} = \frac{I_{\text{mig}}}{I_{\text{PEG}} + I_{\text{mig}} + I_{\text{BCA}}} \cdot R^{-1}_{\text{mig}} \tag{2}
\]

\[
\text{molFr}_{\text{BCA}} = 1 - \text{molFr}_{\text{PEG}} - \text{molFr}_{\text{mig}} \tag{3}
\]

\[
\text{weightFr}_{\text{PEG}} = \frac{\text{molFr}_{\text{PEG}} \cdot \text{MW}_{\text{PEG}}}{\text{molFr}_{\text{PEG}} \cdot \text{MW}_{\text{PEG}} + \text{molFr}_{\text{mig}} \cdot \text{MW}_{\text{mig}} + \text{molFr}_{\text{BCA}} \cdot \text{MW}_{\text{BCA}}} \tag{4}
\]

\[
\text{weightFr}_{\text{mig}} = \frac{\text{molFr}_{\text{mig}} \cdot \text{MW}_{\text{mig}}}{\text{molFr}_{\text{PEG}} \cdot \text{MW}_{\text{PEG}} + \text{molFr}_{\text{mig}} \cdot \text{MW}_{\text{mig}} + \text{molFr}_{\text{BCA}} \cdot \text{MW}_{\text{BCA}}} \tag{5}
\]

\[
C_{\text{PEG}} = \frac{W_{\text{dry}} \cdot \text{weightFr}_{\text{PEG}}}{\text{MW}_{\text{PEG}} \cdot V} \tag{6}
\]

\[
C_{\text{mig}} = \frac{W_{\text{dry}} \cdot \text{weightFr}_{\text{mig}}}{\text{MW}_{\text{mig}} \cdot V} \tag{7}
\]

\[
V_{NP} = \frac{4}{3} \pi r^3 \tag{8}
\]

\[
W_{NP} = V_{NP} \cdot \rho \tag{9}
\]

\[
N_{NP} = \frac{W_{\text{dry}}}{W_{NP}} \tag{10}
\]

\[
A_{NP} = 4\pi r^2 \tag{11}
\]

\[
\frac{N_{\text{PEG}}}{N_{NP}} = C_{\text{PEG}} \cdot \frac{N_{A}}{N_{NP}} \tag{12}
\]

\[
\frac{N_{\text{PEG}}}{\text{NP area}} = \frac{N_{\text{PEG}}}{N_{NP}} \cdot \frac{1}{A_{NP}} \tag{13}
\]
Table 2: NP size in water, 8% BSA and rat serum (RS), measured by NTA.

|          | Water | 8% BSA | RS  |
|----------|-------|--------|-----|
| JA/SDS   | 222,4 | 179,6  | 178,6|
| JA/Brij  | 143,5 | 166,1  | 180,8|
| Kol/Brij | 157,1 | 168,1  | 237,3|
| Kol/Plu  | 141,9 | 157,5  | 211,6|
Figure 3. TGA-DSC curves of NPs a) Kol/Brij, b) Kol/Plu, c) JA/SDS and d) JA/Brij for the determination of PEG amount (wt%) of the total particle mass. The inset figures in the right upper corner of image b)-d) are zoomed images of the temperature interval 160-300°C, showing the region at which the combustion of PEG starts at T~240-250°C, proceeding up to T~400°C.
Figure 4: ToF-SIMS data from a) the PEG fragment $\text{C}_2\text{H}_5\text{O}^+$ and from b) the PBCA fragment $\text{C}_4\text{H}_2\text{NO}_2^-$. N=4