Fig. S1

- Pulsating air pump
- Optical fiber (detection)
- Optical fiber (illumination)
- Light source
- Spectrometer
- Whirling action
- Hollow tube for mixing
- Central fiber for detection
- Peripheral fibers for illumination
- LSPR sensor
|         |         | 1–BT       | 1–HT       | 1–OT       |
|---------|---------|------------|------------|------------|
| **Au**  | **Air** | ★★★        | ★★★        | ★★         |
| 1 week  |         | ABS: 0.0027 ± 0.016 | ABS: 0.0019 ± 0.015 | ABS: 0.0037 ± 0.019 |
|         | **N₂**  | Peak: 0.57 ± 0.78 nm | Peak: 0.63 ± 0.94 nm | Peak: 0.64 ± 1.1 nm |
| **Au**  | **Air** | ★★★        | ★★★        | ★★         |
| 2 weeks |         | ABS: 0.0018 ± 0.014 | ABS: 0.0017 ± 0.018 | ABS: 0.0024 ± 0.021 |
|         | **N₂**  | Peak: 0.67 ± 0.81 nm | Peak: 0.61 ± 0.92 nm | Peak: 0.70 ± 3.86 nm |
| **Ag**  | **Air** | ★★         |            | ★★         |
| 1 week  |         | ABS: 0.0021 ± 0.015 |            |            |
|         | **N₂**  | Peak: 0.51 ± 1.4 nm |            |            |
| **Ag**  | **Air** | ★★         |            |            |
| 2 weeks |         | ABS: 0.0021 ± 0.021 |            |            |
|         | **N₂**  | Peak: 0.42 ± 0.66 nm |            |            |
| **Ag**  | **Air** | ★★         |            |            |
| 2 weeks |         | ABS: 0.0028 ± 0.037 |            |            |
|         | **N₂**  | Peak: 0.59 ± 0.97 nm |            | ABS: 0.0022 ± 0.049 |
|         |         |            |            | Peak: 0.84 ± 2.67 nm |
Fig. S2
Fig. S3

Scattering Intensity vs. Wavenumbers (cm\(^{-1}\))

Key Wavenumbers:
- 695 cm\(^{-1}\)
- 706 cm\(^{-1}\)
- 1111 cm\(^{-1}\)

Time Intervals:
- 5 min
- 15 min
- 30 min
- 120 min
- 480 min
- 28 h
Fig. S4
Fig. S5

The graph shows the mass percent (%) of elements Cl, Ag, and Au in different samples.

- **Ag**: The highest mass percent is 99.5% in Ag-based sensor.
- **Ag based sensor**: Contains Ag and other elements.
- **Ag based sensor + NaCl aq**: Contains Ag and other elements.

Element distribution:

- **Cl**: 0.1%
- **Ag**: 99.5%
- **Au**: 18.9%
- **Ag + NaCl aq**: 18.9%