Monofunctional Organic Cage for Gold Nanoparticles

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Due to their unique properties, functional gold nanoparticles (AuNPs) are of major interest for molecular electronics.[1-3] AuNPs have successfully been stabilized by a single benzylic thioether-based organic cage which offers further chemical functionality by exposing a single protected acetylene. Their size corresponds to the cage structure (1.42 ± 0.54 nm) and they withstand thermal stress up to 100 °C. From thermogravimetric analysis, we find that one ligand stabilizes an average of 54 gold atoms which stands in close agreement to literature known 1.44 nm Au_{55} clusters.[4] The Au NPs were used to synthesize dimers via acetylene homocoupling, giving proof of the AuNPs monofunctionality. The dimers can be columned by size-exclusion chromatography and are bench-stable for an extended period.

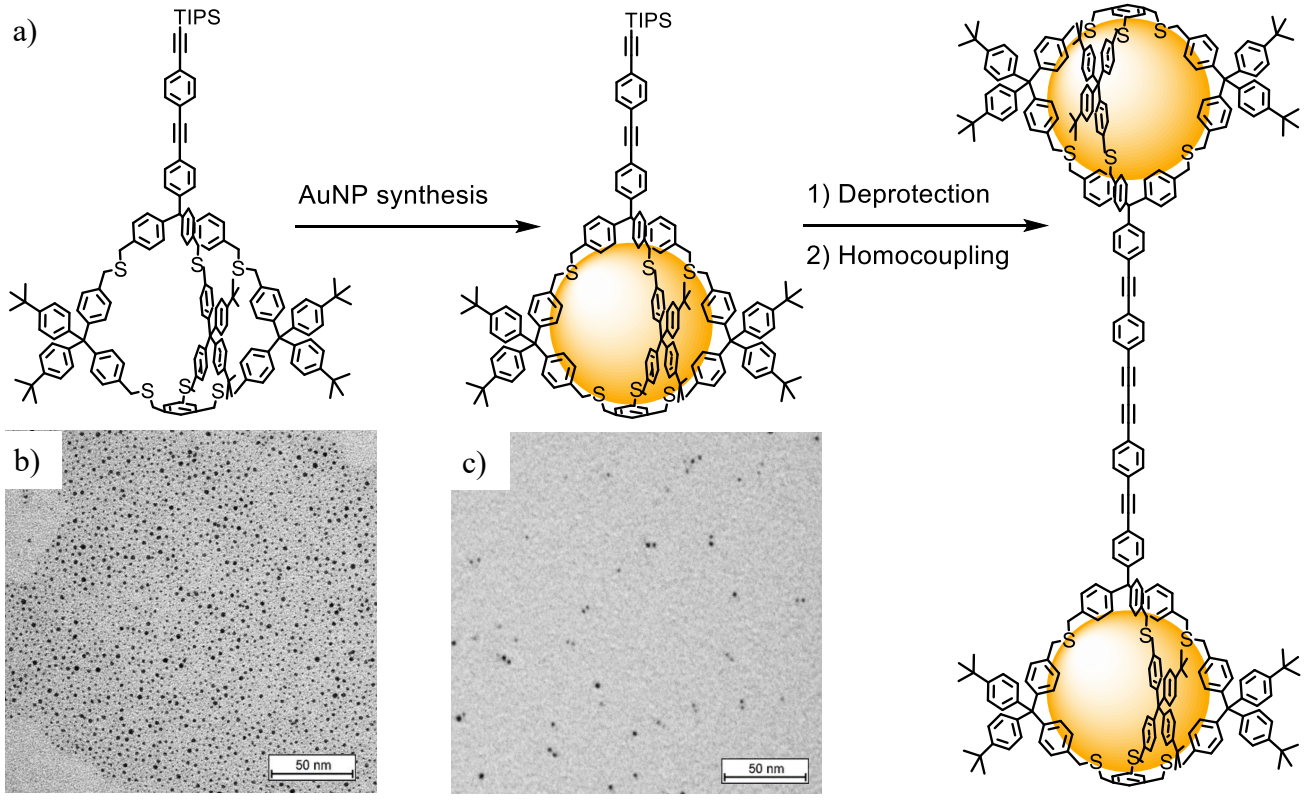

Figure 1. a) Reaction scheme from the organic cage to the homocoupled AuNP dimer; b) Micrograph of as-synthesized AuNPs; c) Micrograph of dilute AuNP dimers.

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