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Colloidal gold nanorods: from reduction to growth KYOUNG-WEON PARK, School of Polymer, Textiles and Fiber engineering,Georgia Institute of Technology, MOSTAFA EL-SAYED, School of Chemistry and Biochemistry, Georgia Institute of Technology, MOHAN SRINIVASARAO, School of Polymer, Textiles and Fiber engineering and School of Chemistry and Biochemistry,Georgia Institute of Technology — Formation of gold nanorods(NRs) in controlled reduction condition was investigated. Gold NRs were synthesized by seed mediated method where pre-made gold nanospheres were added to a growth solution containing surfactants, reducing agent and compound of gold ion and surfactant. Reduction mechanism was manipulated by changing catalytic activity of seed. Seed of different size and capping agent coverage led to different dispersity of NRs since seed plays a role as catalyst as well as nucleation site. The difference between the redox potentials of gold species and reducing agent(ΔE) was controlled by the strength of reducing agent and the stability of the gold compound. As ΔE leading to changing the morphology of resulting gold NRs. The surface of gold NRs with a series of aspect ratio was functionalized by thiolated beta cyclodextrin which binds preferentially to the end of NRs and promotes the orientation of rod-rod pair even without host-guest interaction.

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