

Abstract Submitted
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Synthesis of stable Au-PEG nanocomposite chains in a single step precursor free method and its formation mechanism and Di-electric behavior¹ RAJESH KUMAR NEOGY, RAJIB NATH, S.N.Bose Centre, GAUTAM BASU, Bose Institute, ARUP KUMAR RAYCHAUDHURI, S.N.Bose Centre — We report a simple and effective one step and one-pot synthesis of stable assembly of Au nanoparticles (diameter 8-10nm) into chains in an Ethylene Glycol medium(MEG), using only a solid metallic Au target and a pulsed excimer laser. No use any external precursor, reducing agent or surfactant so it is a chemistry free synthesis route. The Au-PEG nanocomposite chains (with unbroken lengths often more than few microns) formed in liquid medium are mechanically and thermally stable and can be transferred unchanged into a solid substrate which can span a large surface area. The nanochains show a broad optical absorption near to visible spectrum. Hybrid of Au nanochains and separated nanoparticles can also be formed using a proper choice of the laser fluence and MEG/DI water concentration. The Au-PEG nanocomposite chains in the medium shows enhanced low frequency dielectric constant & electrical conductivity. NMR shows that due to the formation of dimer/trimers of MEG molecules that formed by the ablation process, attach to the Au nanoparticles and facilitate the nanocomposite chain formation.

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