# Covalently linked multimers of gold nanoclusters $Au_{102}(p\text{-MBA})_{44}$ and $Au_{\sim 250}(p\text{-MBA})_n$

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We present synthesis, separation, and characterization of covalently-bound multimers of *para*-mercaptobenzoicacid (*p*-MBA) protected gold nanoclusters. The multimers were synthesized by performing a ligand-exchange reaction of pre-characterized $Au_{102}(p\text{-MBA})_{44}$ nanocluster with dithiol. The reaction products were separated using gel electrophoresis yielding several distinct bands. The bands were analyzed with transmission electron microscopy (TEM) revealing monomer, dimer, and trimer fractions of the nanocluster. TEM analysis of dimers in combination with molecular dynamics simulations suggest that the nanoclusters are covalently bound via a disulfide bridge between dithiol molecules. The linking chemistry is not specific to $Au_{102}(p\text{-MBA})_{44}$. The same approach yields multimers also for a larger monodisperse *p*-MBA –protected cluster of approximately 250 gold atoms, $Au_{\sim 250}(p\text{-MBA})_n$.