Exploring the influence of Diels?Alder linker length on photothermal molecule release from gold nanorods

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 We studied the photothermal release of carboxyfluorescein (CF) linked to the gold surface of gold nanorods (GNRs) by two Diels?Alder adducts of different lengths (n = 4 and n = 9). The functionalized GNRs were irradiated with infrared light to produce photothermal release of CF by a retro-Diels?Alder reaction. The adducts were chemisorbed on the GNRs and the functionalized nanoparticles were characterized by UV?vis, DLS, zeta potential and Raman and surface-enhanced Raman spectroscopy (SERS). On the basis of the degree of nanoparticle functionalization and the SERS results, we inferred the orientation of CF on the surface of the gold nanoparticle. Moreover, we determined the photothermal release profiles of CF from the gold surface by laser irradiation. The release was faster for the longer linker (n = 9). SERS revealed that, for the shorter linker (n = 4), molecules are oriented perpendicularly with respect to the gold surface, thereby maintaining the CF far from