‘Hard-Core’ Diels–Alder

Significance: A Diels–Alder reaction is used for the first time to functionalize the surface of diamond nanoparticles. Direct C–C coupling is achieved by reacting α-quinodimethanes with π-bonds on the surface of thermally annealed nanodiamond. Increasing the annealing temperature and introducing electron-withdrawing groups to the diene both lead to higher surface loading.

Comment: This method offers facile modification of surface properties of nanodiamond. The arylated particles are very stable and can be further decorated by electrophilic aromatic substitution. For instance, 4-carboxy-α-quinodimethane-functionalized particles 2b are soluble in water and PBS buffer, while Oregon Green tagged conjugate 5 can be purified by conventional column chromatography.