Supramolecular Fullerene Polymers Formed by Host-Guest Complexation between Calix[5]arene and C_{60}

Takeharu Haino
Graduate School of Science, Hiroshima University
1-3-1 Kagamiyama, Higashi-Hiroshima, 739-8526 Japan

Figure 1. Supramolecular polymer formed by host-guest interaction between a calix[5]arene and [60]fullerene. Covalently-linked double-calix[5]arenes take up C_{60} into their cavities.\(^{1}\) This complementary interaction creates a strong non-covalent bonding; thus, the iterative self-assembly between dumbbell fullerene 1 and ditopic host 2 can produce the supramolecular polymer networks.\(^{2}\) Fluorescence spectrum of 2 showed intense band at 466 nm, which was quenched by the addition of 1. Job plot confirmed a 1:1 stoichiometric ratio of 1 and 2 in the supramolecular association. Diffusion coefficients of a mixture of 1 and 2 were concentration dependent. As increased the concentration, the diffusion coefficients decreased, suggesting that supramolecular polymeric aggregates were formed in solution. The supramolecular polymers of 1 and 2 was also characterized by SEM and AFM measurements.