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Wide Angle X-ray Scattering Studies of C₆₀ Miscibility with Polymers KATIE CAMPBELL, DAVID BUCKNALL, YONATHAN THIO, BILGE GURUN, Georgia Institute of Technology — C₆₀ and other fullerenes have been shown to have limited solubility in common organic solvents and to form charge-transfer complexes with a variety of small molecules. Among factors that promote solubility and charge-transfer complex formation are aromaticity, electron donating capability, atoms much larger than carbon such as chlorine. However, studies of C₆₀ miscibility with polymers have been limited. We previously showed that C₆₀ has a miscibility limit of ~1wt% with polystyrene via wide angle x-ray scattering (WAXS) and molecular dynamics simulations. We have studied a series of polymers with structural features shown to be important in small molecule/C₆₀ interactions using WAXS: poly(para-phenylene ethynylene), poly(4-vinylpyridine), poly(vinylpyrrolidone), poly(4-chlorostyrene), poly(9-vinylphenanthrene), and poly(2-vinylnaphthalene). In each case, the point of C₆₀ aggregation, observable by WAXS, was taken as the miscibility limit for a given polymer system. The miscibility of C₆₀ in these polymers was correlated with the factors mentioned above and compared with the miscibility in solvents with analogous structures as the repeat units.

Katie Campbell
Georgia Institute of Technology

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