

# Synthesis and properties of perfluorocarbon functionalized polymers

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Previous studies on polyacrylamides with pendent perfluorocarbon (C<sub>8</sub>F<sub>17</sub>) groups have shown pronounced association in aqueous solutions but interestingly very strong association has been shown in dioxane and other organic solvents indicating the presence of strong fluorophilic association. A study of these effects on the compatibilization of 1/1 blends of C<sub>7</sub>F<sub>15</sub> end-functionalized polystyrene (PS) and polybutylmethacrylate (PBMA) was carried out. Narrow MW distribution end- and pendent perfluorocarbon functionalized polystyrene (RF-PS) and the corresponding polybutyl methacrylate (RF-PBMA) were prepared by ATRP. In sharp contrast with blends of the PS/PBMA without RF end groups, the optical transparencies of films of the blends of the RF polymers show nearly complete transparencies between 300 and 800 nm. TEM morphologies show long but well defined lamellae with small (< 40 nm) diameters. On the other hand AFM's of the blends show semi-ordered cratered surfaces with crater depths of 20 nm and diameters of 100 nm. Blends of the unfunctionalized polymers show the expected micron sized domains without any order. The compatibilizing effect of the RF end-groups generally increases with RF size and is greater than that of the corresponding pendent-groups.