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Organometallic Polymer-Derived Catalyst Dispersion Effects on SWNT Growth SARAH LASTELLA, PULICKEL M. AJAYAN, CHANG Y. RYU, Rensselaer Polytechnic Institute, DAVID RIDER, IAN MANNERS, University of Toronto — Catalyst formation kinetics of a ferrocene-containing homopolymer, polyferrocenylethylmethylsilane or PFEMS, is investigated as it relates to the catalysis of single walled carbon nanotubes (SWNTs) and is compared with that of the corresponding diblock copolymer, poly(styrene-b-ferrocenylethylmethylsilane) or PS-b-PFEMS. The polystyrene blocks in the PS-b-PFEMS form a matrix to uniformly disperse discrete nanoscale iron domains that enhance the uniformity of nanotube diameters compared to the homopolymer. PFEMS homopolymer contains 23 percent iron by weight, while PS-b-PFEMS with a 25 vol percent PFEMS is only 6 percent iron, respectively. It is concluded that iron present in a block copolymer film is two times more active than a PFEMS film, and in turn, leaves a lower iron density on the substrate surface relative to its nanotube yield.

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