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Study on Interfaces and Adhesion of Polymers by Energy-Filtering Transmission Electron Microscopy

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Interfaces between poly(methyl methacrylate),(PMMA), and poly(styrene-co-acrylonitrile), (SAN), were investigated by energy-filtering transmission electron microscopy (EFTEM). Elemental maps and Image EELS were employed by EFTEM, which enable to obtain the concentration profiles of nitrogen and oxygen across the interfaces in PMMA/SAN laminates with a spatial resolution less than 10 nm. The interfacial thickness were estimated in the laminates with different AN contents in SAN. It revealed that the interfacial thickness depends on the AN content in SAN and annealing temperatures. The adhesion strength of PMMA/SAN was evaluated by asymmetric double contilever beam test (ADCB), and the correlation between the interface structure and the adhesion strength was discussed.