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Synthesis and Characterization of Polyimide/New Aromatic Silsesquioxane Hybrid Composites

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Aromatic polyimides have found a wide range of application as high-performance materials in the aerospace and electronics industries, due to their excellent electrical, thermal, and high-temperature mechanical properties. Rencently Organic/Inorganic hybrid materials have been widely studied because novel materials properties can be produced through systematic design of the organic and inorganic segments. The hybrid materials offer the possibility of combining the advantages and overcoming the disadvantages of the two different materials. In this study, polyimide/new aromatic silsesquioxane hybrid composites, were prepared using an in situ sol-gel reaction and multistep curing. PI was prepared from 3,3',4,4'-biphenyltetracarboxylicdianhydride (BPDA) and oxydiphenylenediamine (ODA) poly(amic acid). The hybrid thin films were prepared by the poly(amic acid)s. Organic/Inorganic hybrid nanocomposite films were characterzed by FT-IR spectra and FT-Raman spectra. Structure of pure BPDA-ODA PI was not changed regardless of the introducing aromatic PSSQ up to 10 weight percent. AFM images directly prove well dispersed organic-inorganic continuous phase morphologies PSSQ in the PI matrix.

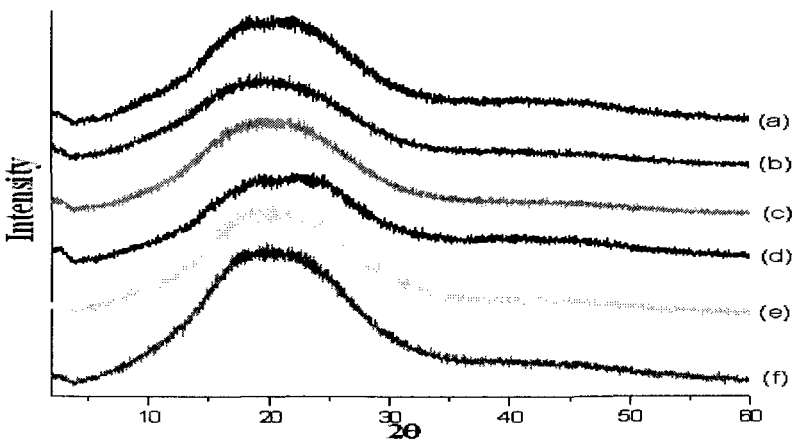

Fig1. X-ray diffraction spectra of pure PI and hybrid films (a)pure PI, (b)OP2, (c)OP3, (d)MP2, (e)MP3, (f)PP2