〔Macromolecules, **24**, 6612-6617 (1991)〕 [Lab. of Pharm. Physical Chemistry]

Electron Spin Resonance Study of the Special Features of Plasma-Induced Radicals and Their Corresponding Peroxy Radicals in Polytetrafluoroethylene.

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The room temperature ESR spectrum of plasma-irradiated powdered polytetrafluoroethylene (PTFE) consists of three kinds of spectral components: double quintet (3.2 and 8.7 mT) as a major spectrum, a triplet (1.3 mT) with broad lateral peaks due to hyperfine anisotropy, and smeared-out broad line. The double quintet and triplet were assigned to the mid-chain radical, $-CF_2-\dot{C}F-CF_2-$, and the end-chain radical, $-CF_2\dot{C}F_2$, respectively and the corresponding peroxyradicals were markedly stable for a long period of time at room temperature due to the absence of hydrogens in PTFE.

〔J. Mater. Chem., **1**, 387-391 (1991)〕 [Lab. of Pharm. Physical Chemistry]

Nature of Dangling-bond Sites in Native Plasma-polymerized Films of Unsaturated Hydrocarbons, and Electron Paramagnetic Resonance Kinetics on Heat Treatment of the Films.

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We describe the electron paramagnetic resonance (EPR) study of dangling-bond sites (DBS) of plasma-polymerized films prepared from three unsaturated hydrocarbons, phenylacetylene, styrene and hex-3-yne. It has been shown that all the EPR spectra of DBS in such native films (before exposure to air) are much more intense than those after exposure to air. However, when exposed to air the DBS decay rather rapidly; this decay tends to level off, indicating that there exist two different types of DBS, reactive and non-reactive.

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Electron Spin Resonance Study on the Nature of Plasma-Induced Radicals of Methacrylate Copolymers Possessing Bulky Organosiloxane Side Chain.

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Plasma-induced radicals of hard contact lens materials composed of crosslinked methacrylic copolymers possessing bulky organosiloxane side chain as a major component were studied by ESR. The computer simulation disclosed the presence of the endchain radical (1) and a small amount of monomer-derived radical (3). Polymer degradation induced by oxygen plasma irradiation has shown that the polymer degradation at initial stages is caused by not only depolymerization of the main chain but also the fragmentation at the organosiloxane moiety.