〔Drug Delivery System, **6**, 119-125 (1991)〕 [Lab. of Pharm. Physical Chemistry]

A New Development of DDS Using Plasma-Irradiated Pharmaceutical Aids.

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We have examined preparations of multilayered particles applicable for DDS by use of plasma processing, and found that controlled-release tablet can be obtained by oxygen plasma irradiation (radio-frequency discharges operating at 13.56 MHz) on the outermost layer of the double-compressed tablet which were fabricated from theophylline tablet as a core material and a mixture of plasma-degradable polyoxymethylene (POM) and plasma-crosslinkable-polystyrene (PST) as a wall material. Dissolution test clearly indicated that the theophylline has been released from the tablet through the resulting micropore, whilst the release from untreated tablets was negligible. It was also found that dissolution profiles of theophylline can readily be controlled by the selection of a variety of factors for tablet fabrications as well as plasma operational conditions.

〔Drug Delivery System, **6**, 437-441 (1991)〕 [Lab. of Pharm. Physical Chemistry]

Release Control of Theophylline from Plasma-Irradiated Double-Compressed Tablet Composed of Polylactic Acid as a Wall Material.

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Oxygen plasma-irradation on the compressed tablet of one of the bioerodible polymers, polylactic acid (PLA), was found to cause only low efficiency in its degradation. Thus, controlled release tablets have been obtained by oxygen plasma irradiation on the outermost layer of the double-compressed tablet which were fabricated from theophylline tablet as a core materials and a mixture of plasma-degradable polyoxymethylene (POM) and bioerodible PLA as a wall material. Dissolution test clearly indicated that the theophylline has been released from the tablet through the resulting micropore, while the release from untreated tablets was negligible.

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Mechanistic Study on Mechanochemical Polymerization of Acrylamide.

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The ESR study of the radicals formed in mechanochemical polymerization of acrylamide (AAM) was undertaken. The nature of the radical formation was compared with the mechano-radical formation produced by mechanical fracture of polyacrylamide (PAAM). The structure of radicals formed were all identified to be an end-chain radical, equivalent to a polymer-chain propagating radical. The computer simulation disclosed that the observed spectra of the propagating radical can be approximated essentially by two kinds of component spectra, a large amount of triplet, and a small amount of quartet (a triplet of doublets). Thus, the existence of two major conformers in a single end-chain radical has been proposed.