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Transdermal Iontophoresis by Polypyrrole/Poly(Acrylic Acid) Hydrogel
PHITHUPHA CHANSAI, ANUVAT SIRIVAT, The Petroleum and Petrochemical College — Transdermal drug delivery system delivers a drug into a body at desired site and rate. The conductive polymer-hydrogel blend between polypyrrole (PPy) doped with anionic drug and poly(acrylic acid) (PAA) were developed as a matrix/carrier of drug for the transdermal drug delivery in which the characteristic releases depend on the electrical field applied. The PAA films and their blend films were prepared by solution casting using ethylene glycol dimethacrylate (EGDMA) as a crosslinking agent. A mechanical blending of PPy particles and PAA matrix was then carried out. Drug diffusions in the blended PPy/PAA hydrogel and the non-blended one were investigated and determined by using a modified Franz-diffusion cell with an acetate buffer, pH 5.5, at 37 °C, for a period of 48 hours to determine the effects of crosslinking ratio and electric field strength. Amounts of the released drug were measured by UV-Visible spectrophotometry. The diffusion coefficient of drug was determined through the Higuchi equation via different conditions, with and without an electric field. Moreover, thermal properties and electrical conductivity of the polypyrrole and drug-loaded polypyrrole were investigated by means of the thermogravimetric analysis and by using a two-point probe meter, respectively.

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