

## ABSTRACT

### PREPARATION, CHARACTERIZATION and EVALUATION of SORPTION STUDIES of ACRYLAMIDE BASED COMPOSITE HYDROGELS CONTAINING MALEIC ACID, STARCH and KAOLIN

Fulya TOPAÇ

M.Sc. Thesis, Department of Chemistry  
Supervisor: Prof. Dr. Erdener KARADAĞ  
2012, 95 pages

In this study, acrylamide monomer and maleic acid as a comonomer and in order to form a composite structure with starch as a naturel polymer and kaolin as a clay mineral have been synthesized for the production of chemically crosslinked copolymers. Hydrogel systems were prepared by free radical polymerization in aqueous solution using poly(ethylene glycol) diacrylate as a crosslinker.

Structural characterization of prepared chemically crosslinked polymers were tried to determine by using Fourier Transform Infrared Spectroscopy (FT-IR). Scanning Electron Microscopy (SEM) micrographs were taken for determination of surface porosity of hydrogels.

Dynamic swelling tests were applied at 25°C for the purpose of investigation of swelling properties of crosslinked copolymers. According to obtained data, parameters concerning swelling kinetics and diffusion mechanism were calculated.

A cationic dye such as toluidine blue was selected as model molecule to investigate of adsorption properties of hydrogels. It was determined that crosslinked copolymers adsorbed dye of toluidine blue from aqueous solutions in high level.

**Key words:** Acrylamide, starch, clay, kaolin, hydrogel, composite, adsorption, toluidine blue.