

Studi pengaruh 4,4'-Diaminostilben-2,2'- Asam Disulfonat terhadap Penguningan tert-Polimer Emulsi (Vinil Asetat-ko- Butil Akrilat-ko-Asam Akrilat)

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Abstrak

Telah dilakukan penelitian mengenai pengaruh 4,4'-Diaminostilben-2,2'-Asam Disulfonat (DSD) terhadap peristiwa penguningan tert-polimer emulsi (vinil asetat-ko-butyl akrilat-ko-asam akrilat). Proses pembuatan tert-polimer emulsi dilakukan melalui polimerisasi radikal bebas secara kontinyu dengan menggunakan vinil asetat (75% berat total monomer) dan butyl akrilat (25% berat total monomer) sebagai monomer utama, amonium persulfat sebagai inisiator natrium bikarbonat sebagai penyangga, perlankrol RN 75 sebagai surfaktan dan air demin sebagai pelarut. Proses polimerisasi dilakukan pada temperatur 70 °C selama 6 jam dengan proses post-polimerisasi pada temperatur 80°C selama 15 jam. Tahap pertama penelitian adalah menentukan jumlah asam akrilat yang optimum dan tahap kedua adalah mempelajari pengaruh DSD terhadap derajat kekuningan, ukuran partikel, berat molekul, temperatur transisi gelas, stabilitas emulsi dan degradasi termal dari tert-polimer emulsi (vinil asetat-ko-butyl akrilat-ko-asam akrilat).

Hasil penelitian menunjukkan bahwa persentase optimum asam akrilat adalah 0,5% dari total berat monomer, DSD harus ditambahkan pada akhir proses polimerisasi untuk mencegah, destabilisasi partikel polimer, penambahan DSD menyebabkan semakin besarnya ukuran partikel akibat dari proses swelling, menurunkan temperatur transisi gelas, meningkatkan berat molekul dan stabilitas termal serta menurunkan derajat kekuningan (yellowness index) dari tert-polimer emulsi. Analisa dengan menggunakan FTIR dan UV/VIS spektroskopis menunjukkan bahwa DSD tidak terikat secara kovalen pada rantai polimer walaupun demikian tert-polimer emulsi dengan DSD membentuk emulsi yang stabil.

.....It has been conducted a research to investigate the effect of 4,4'-Diaminostilbene-2,2'-Disulfonic Acid (DSD) that is a fluorescent whitening agent to the yellowing discoloration of tert-polymer emulsion (vinyl acetate-co-butyl acrylate-co-acrylic acid). Tert-polymer emulsion is synthesized through free radical continuous emulsion polymerization by using vinyl acetate (75% w/w total monomer) and butyl acrylate (25% w/W total monomer) as main monomers, ammonium persulfate as an initiation sodium bicarbonate as a buffer, penlankrol RN 75 as a surfactant and deionized water as a solvent. Polymerization ran at temperature 70 °C for 6 hours and then continued to post-polymerization at 80 °C for 15 hours. Firstly we studied the optimum concentration of acrylic acid that has to be added to the copolymer and afterwards we investigated the effect of DSD to the particle size, molecular weight, glass transition temperature, yellowness index, emulsion stability and thermal degradation of tert-polymer emulsion (vinyl acetate-co-butyl acrylate-co-acrylic acid).

From the research resulted, the optimum concentration of acrylic acid is 0, 5% of the weight total of monomer DSD has to be added at the end of polymerization to avoid destabilization of polymer particles as well as inhibition. By increasing the concentration of DSD, the particle size distribution of tert-polymer emulsion will be more coarse caused by swelling process, glass transition temperature of polymer will be decreased, molecular weight and thermal stability will be increased and the yellowness index is decreased. By means of FT-IR and UV/VIS spectroscopies it was found that the DSD is not covalently bond to the

polymer chain, however the tert-polimer emulsion with a presence of DSD formed a stable emulsion.