

# Eksplorasi polivinil alkohol sebagai koloid pelindung pada sintesis polimerisasi emulsi polivinil asetat untuk aplikasi perekat = Exploration of polyvinyl alcohol as protective colloid in polyvinyl acetate emulsion polymerization synthesis for adhesive applications

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## Abstrak

Penelitian telah dilakukan untuk mengetahui pengaruh konsentrasi koloid pelindung Polivinil Alkohol (PVA) terhadap kekuatan daya rekat polimer emulsi Polivinil Asetat (PVAc). Sintesis polimerisasi emulsi dilakukan dengan teknik semi-kontinyu dengan komponen polimerisasi terdiri dari air, larutan PVA terhidrolisis sebagian medium viscosity, dan surfaktan SDS. Sementara monomer Vinil Asetat (VAM) dan inisiator APS diberikan secara kontinyu selama proses sintesis berlangsung dengan temperature reaksi  $\approx 70^{\circ}\text{C}$ , kecepatan agitasi 300 rpm, dan waktu reaksi 5 jam dengan variasi konsentrasi larutan koloid pelindung PVA 2 wt%, 5 wt% dan 10 wt%. Kekuatan rekat polimer PVAc dilakukan dengan uji kuat geser terhadap kayu triplek mengikuti standar ASTM D905-03 dan diperoleh nilai shear strength PVAc meningkat seiring bertambahnya konsentrasi PVA sebesar 96, 225, 277, dan 421 kiloPascal. Parameter lain hasil akhir polimer juga dievaluasi dalam penelitian ini, meliputi temperatur reaksi, kandungan padatan, viskositas, nilai pH, dan densitas. Uji gugus fungsi pembentukan PVAc telah dilakukan dengan Spektrometer FTIR dan diketahui adanya gugus carbonyl C=O stretching & C=C stretching, dan gugus hydroxy O-H stretching. Ukuran partikel diuji dengan Dynamic Light Scattering PSA dan diperoleh ukuran 216 nm untuk PVAc tanpa koloid pelindung, sedangkan pada PVAc dengan koloid pelindung PVA berkisar antara 35-68,5 nm. ....Research has been conducted to determine the effect of the concentration of protective colloid Polyvinyl Alcohol (PVA) on the adhesive strength of Polyvinyl Acetate (PVAc) emulsion polymer. The synthesis of emulsion polymerization was carried out using a semi-continuous technique with polymerization components consisting of water, partially hydrolyzed PVA solution with medium viscosity, SDS surfactant. Meanwhile, Vinyl Acetate (VAM) monomer and APS initiator were administered continuously during the synthesis process with a reaction temperature of  $70^{\circ}\text{C}$ , agitation speed of 300 rpm, and a reaction time of 5 hours with variations in the concentration of the protective colloid PVA solution 2, 5 and 10% by weight. The adhesive strength of the PVAc polymer was carried out by a shear strength test against plywood following the ASTM D905-03 standard and the value of the shear strength of PVAc increased with the increase in PVA concentration of 96, 225, 277, and 421 kiloPascal. Other parameters of the final polymer yield were also investigated in this study, including reaction temperature, solids content, viscosity, pH value, and density. Function group test for PVAc formation has been carried out with an FTIR Spectrometer and it is known that there are carbonyl groups C=O stretching & C=C stretching, and hydroxy groups O-H stretching. The particle size was tested with Dynamic Light Scattering PSA and obtained a size of 216 nm for PVAc without a protective colloid, while for PVAc with a PVA protective colloid it ranged from 35-68.5 nm.