Kutsalin Kaveerat 2010: Hydrophobic Behaviors and Friction Losses of Anacardic Acid Based Phenolic Resins. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Attasak Jaree, Ph.D. 72 pages.

Anacardic acid, by-product of the cashew nut processing industry, was synthesized with cresol and formaldehyde using magnesium hydroxide as alkali catalyst. Anacardic acid based resole-type phenolic resins, the newly developed polymer, can be used to reduce friction losses/ operating cost for material transfer in a variety of processes. The surface characteristics of anacardic acid based resole-type resins were studied via contact angle measurement. The three-liquid method was utilized to determine the Lifshitz-van der Waals components (γ^{LW}), electron-acceptor (γ^{+}) and electron-donor (γ^{-}) parameter of the prepared coatings. The lowest values of the γ^{LW} (24.44 mJ/m^2), γ^{-} (2.27 mJ/m^2) and the work of adhesion between water and resins (16.13 mJ/m^2) were observed for the case that anacardic acid was condensed with cresol and formaldehyde at the molar ratio of 1.55:0.38:3.5. Results suggested that anacardic acid based resole-type resin has lower resistance to water than phenol-formaldehyde resin. Furthermore, the formation of phenolic coatings was studied by Fourier transform infrared (FTIR) spectroscopic analysis and the melting point of phenolic coatings (184.14^{o}C) was determined by differential scanning calorimeter (DSC). FTIR spectrum of AnAc based-resole type resin shows the condensation of methylolated AnAc and the degree of *ortho*- and *para*- substitution. Stainless steel coated with this polymer provided a significant maximum reduction in pressure drop and Fanning friction factor (Reynolds number 4.36E+04 to 7.56E+04) around 14% (compared to the non-coated pipe) for the water flow in pipe (Reynolds number = 4.38E+04).

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