Modified PolyVinyl Alcohol and Its Application as Greaseproof Coating Agent

周有信、彭元興

E-mail: 374904@mail.dyu.edu.tw

ABSTRACT

Coating polyvinyl alcohol (PVA) to base paper confers certain degree of resistivity to oil/grease, water, and air permeability. The numerous hydroxyl groups along the polymer chains, however, often lead to tackiness when the coated paper is rewetted; behaving much like a licked stamp (the tackiness factor was 2.50~3.0 g/m2). Thus, how to maintain the greaseproof and water resistance efficacy of the polyvinyl alcohol coating film while reduce or remove the tackiness to enhance the serviceability of a PVA-coated paper is an issue worthy of investigation. The study was carried out in 2 stages. In the first stage, PVA substrate was modified with polyurethane (PU) resin, glyoxal, and quaternary ammonium chemicals at various blending ratio, pH and reaction temperature. In the second stage, the dried modified PVA film samples were analyzed with a Fourier-transformation infrared (FTIR) spectroscopy to ascertain the degree of modification. Then the modified PVA preparations were coated upon base paper and their resistance to grease, water, and air permeability were determined along with their rewetting tackiness. PVA modified with glyoxal, PU resin, or quaternary ammonium salt were found to have decreased hydroxyl (-OH) stretching intensities along with increasing modification chemical doses. These observations proved that after reacting with these chemicals, the hydroxyl groups were grafted with modifiers and had reduced hydrophilicity, and rewetting tackiness. Coating analyses results indicated that with separate treatments of PVA with glyoxal, PU resin, and quaternary ammonium salt, rewetting tackiness all reduced with the modified products. The best results was achieved with PVA reacting with glyoxal at 1: 0.25 ratio at 90°C and pH 1.5. The tackiness after rewetting was reduced to 0.82 g/m2. Modified PVA generally have improved greaseproof efficacy. The best achieved a Kit value of 11. Modification with PU resin produced modified PVAs with water resistance Stockigt value of 25 s or more.

Keywords : rewetting tackiness

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