INVESTIGATION ON THE PHYSICAL AND RHEOLOGICAL PROPERTIES OF ACRYLATE-STYRENE-ACRYLONITRILE POLYMER AND NANO ALUMINUM OXIDE MODIFIED ASPHALT BINDERS NANO ALUMINUM OXIDE MODIFIED ASPHALT BINDERS

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ABSTRACT
This study investigates the physical and rheological properties of asphalt binder modified by acrylate-styrene-acrylonitrile (ASA) polymer and nano aluminum oxide (AL₂O₃). The tests implemented in the study were conventional tests, rotational viscosity, X-ray diffraction (XRD) and dynamic shear rheometer (DSR). The obtained results of conventional tests showed that the addition of both modifiers up to 5% increased the hardness of asphalt and reduced their temperature susceptibility. XRD results outcome approved new structural phases formed by using ASA polymer meanwhile structural of base binder had not changed by adding nano AL₂O₃. The rheological property of modified binders enhanced at low temperatures and high temperatures, as the results of DSR test showed that the complex modulus and fail temperature were improved whereas the phase angle decreased slightly. Adding a different concentration of ASA and AL₂O₃ to base binder had significant effects of high temperatures rutting resistant and improved low temperature fatigue. Obviously the influence of nano AL₂O₃ on base asphalt binder was greater than modification of ASA polymer. KEYWORDS: modified asphalt binder, ASA polymer, nano AL₂O₃, Physical and rheological properties and DSR.