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ATOMIC FORCE MICROSCOPY (AFM) STUDIES OF ELASTOMER MODIFIED ASPHALTS

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Bitumen can be considered as a colloidal dispersion where the components of highest molecular weight, the asphaltenes, are dispersed into a medium constituted by the remaining components, maltenes (such as resins, aromatics and saturated compounds). It is a black material mainly obtained from crude oil distillation [1]. Bitumen properties like: impermeability, ductility, adhesive properties or resistance against water make this material suitable to many applications, among which road and pavements constructions are good examples [2]. Unfortunately asphalt pavements can rut, as a consequence of the accumulated plastic deformation due to either high loads or high temperatures [3]. To improve performance of asphalts different types of polymers are added. Polymers for bitumen's modification can be classified into two categories: "passive" (like SBR, SBS, LDPE, EVA) and "active" (polymers containing functional groups able to chemically interact with polar groups of asphaltenes or resins [4]).

In this paper the results of atomic force microscopy studies of asphalt modified with different types of elastomers are shown. From AFM images the characteristic parameters of microstructure like dimensions of dispersed phase, interparticle distance and topographical view are drawn and compared. It can be concluded that reactive polymers (for example urethane prepolymers) used as asphalt modifiers yield more compact asphaltenic regions, as compared to neat asphalt and asphalt modified with passive additives.

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