

Enhancement of interfacial adhesion in bitumen coatings by film-forming agents

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Abstract

A way for enhancing the interfacial (maltene - asphaltene) adhesion in bitumen coatings is to modify the surface of the disperse phase. For selecting a modifying agent, it should be taken into account that such an agent should have high affinity to both the surface of disperse phase and film-forming agent. Also, high strength and hardness of the coating are required and thermodynamic compatibility, i.e. the solubility parameters for bitumen components should not differ significantly (14.3 - 28.6 (MJ/m³)^{0,5}). The thermopolymer-based film forming agents (TFF) are copolymers of unsaturated hydrocarbons (HC). They are synthesized from by-products formed upon gasoline pyrolysis aimed at preparing ethylene, propylene and other monomers. TFF are successfully used as effective structuring additives to low-viscosity bitumens and petroleum residues. The possibility and practicability of using TFF for this purpose have been proven by investigations performed for a dark TFF, pyroplast. TFF forms a film due to physical (van der Waals or electrostatic) forces rather than as a result of chemical reactions. Comparison of the solubility parameters implies that TFF may prove compatible with aromatic maltenes. © IDOSI Publications, 2013.

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Keywords

Adhesion-strength properties, Film-forming agents, Intramolecular structuring, Microscopy, Thermopolymer-based