

Bitumen traceability using X-Ray Fluorescence (XRF) Analysis

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Bitumens viscoelastic and hydrophobic properties makes it inevitable in asphalt paving industry, as waterproofing materials for asphalt roofing board and for other insulation purposes. Applications of bitumen as roofing membranes is a common sealing method where several layers of bitumen are installed. Bitumen is a viscoelastic material and often permeates through the membranes causing lack of solidity. It is often a contentious case to identify the source of the slackened bitumen. In this study the identification of the origin of bitumen using XRF is presented.

Several bitumen specimens were measured with standard energy-dispersive X-ray fluorescence analysis (EDXRF) – in particular with a Panalytical Epsilon-5 spectrometer. Distinct differences in the "fingerprints" for the bitumen samples could be identified, permitting to differentiate materials originating from several suppliers. Up to 20 chemical elements can serve as clear indicators of origin.

The quantification of the identified elements were attempted by total-reflection XRF spectrometry (TXRF), a variant of standard EDXRF with special geometry and superior sensitivities.