

IR-SPECTRUM AND X-RAY FLUORESCENCE ANALYSIS OF MODIFIED BITUMEN BASED ON ZINC ACRYLIC OLIGOMERS

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Introduction

Recently, the use of polymer-based additives in bitumen modification has increased significantly. In particular, two main types of polymers, elastomer and plastomer, are widely used. Plastomers are commonly used to improve the elastic properties of binders and increase the resistance to permanent deformation of coatings. However, elastomers have been used to improve the fatigue and low-temperature cracking resistance of binders [1]. In order to study the effect on the physical and chemical properties of soft bitumen emulsion, studies were conducted on the use of secondary products, which are elastomeric polymers, and sulfur as a bitumen additive [2]. In many experiments conducted to determine the elasticity, mass loss or wear resistance of bitumen modified with copolymers, it was found that bitumen modified with copolymers and sulfur has a very positive effect on elasticity and wear resistance [3]. Studies have shown that the internal structure of the modified bitumen is homogeneously distributed as a result of the reaction between the metal and the binder, and the cracking problems that may occur between them have disappeared [4].

Analysis of results. The IR-spectrum of modified bitumen was analyzed on the Specord-75 IR spectrograph device, and the vibration of the C-H bond in the aromatic ring contained in the bitumen was observed in the region of 3441 cm^{-1} . The vibration of C-S-S-C bonds was invisible in the region of 2330 cm^{-1} . -C=N- valence vibration in acrylonitrile was observed in the region of 1600 cm^{-1} , binding of zinc metal was observed in the region of 648 cm^{-1} (Fig. 1).



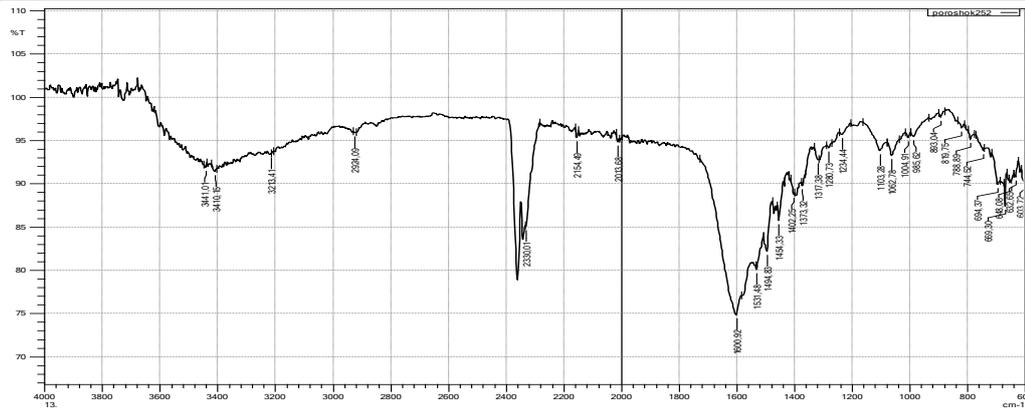
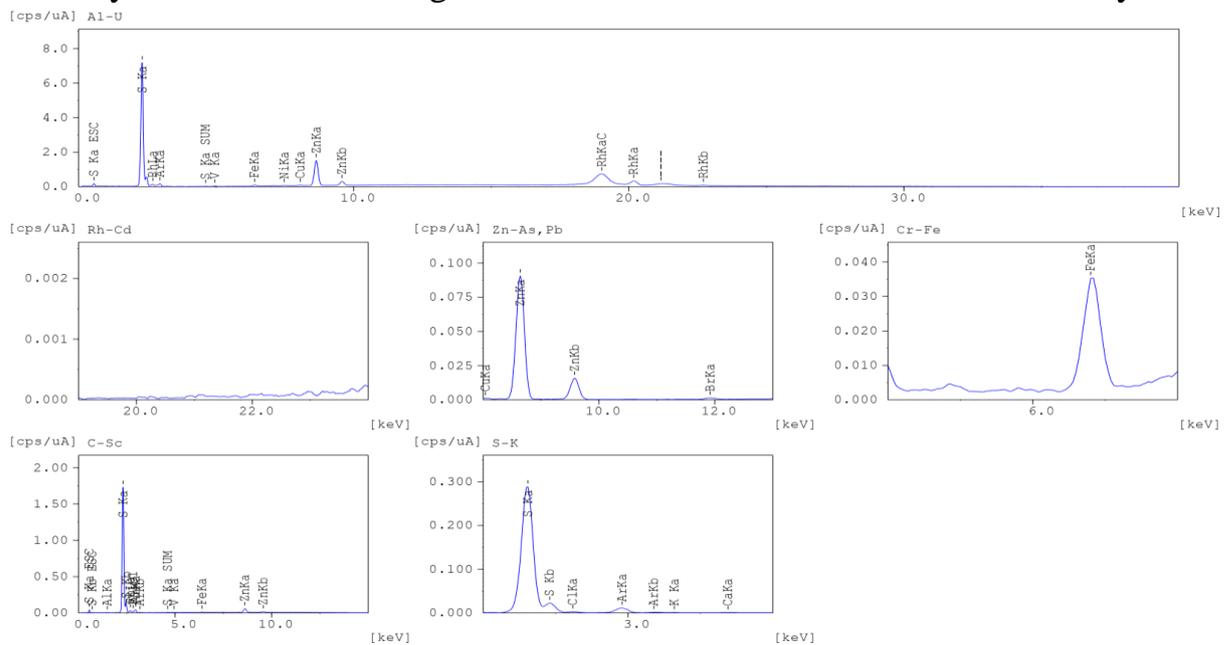


Figure 1. IR spectrum of modified bitumen

It can be seen from the results of the IR-spectrum analysis that the substances involved in bitumen modification are completely separated.

X-ray fluorescence analysis of modified bitumen. X-ray fluorescence analyzes of bitumen modified with zinc-containing acrylic oligomers were obtained. The analyzes were carried out on the EDX-8100 instrument. In the course of research, it was carried out in the atmosphere of atmospheric air, in the time interval from 10 to 30 seconds. The first stage was carried out between Al-U metals, the second stage was carried out between Rh-Cd metals, the third stage was carried out between C-Sc elements, the analysis time of one sample was 10 minutes, 50 kV to Al-U analytes voltage and current of 321 A, Rh-Cd; 15 kV voltage and 1000 A current were used for analytes, and 50 kV voltage and 453 A current were used for C-Sc analytes.



X-ray fluorescence analysis of bitumen modified with zinc-containing acrylic oligomers

It can be seen from the X-ray fluorescence analysis results of the bitumen modified with zinc acrylic oligomers that the initial it can be seen that the substances have completely reacted.

References

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