

Investigation of Bitumen Aerosols

Camil Bocaniciu

Institute of Materials Chemistry, TU Wien, Austria

Pavements found in urban areas are mainly built (more than 70%) from asphalt concrete mixtures containing bitumen as a binding agent alongside mineral stone. Bitumen is obtained from a viscous, semi-solid petroleum and consists of different organic compounds such as polycyclic aromatic hydrocarbons, carboxylic acids, saturated hydrocarbons and heterocyclic compounds. During the pavement, the asphalt is heated to temperatures above 130°C which causes the asphalt concrete to emit small organic compounds in the air, which condensate to aerosol particles also known as secondary organic aerosols (SOA). These aerosols were found to be highly hazardous especially for people working in the asphalt construction industry due to their size which is highly detrimental for the respiratory system and can lead to carcinogenicity. The following thesis will be focused on analyzing and characterizing the bitumen aerosols size and concentration from pavements by using different equipment such as wideband integrated bioaerosol sensor (WIBS5), optical particle counter (OPC), scanning electron microscope (SEM) and scanning mobility particle sizer (SMPS) as well as correlating the results with a way of improving the working environment of the workers in the asphalt industry.

