Short Communication

Electrochemical and Mechanical Properties of Asphalt Concrete Modified by Carbon Microfibers

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Carbon microfibers (CMFs) due to their flexibility, durability, conductivity and superior strength have great potential as reinforcement materials in asphalt concrete. This work focuses on the electrochemical and mechanical properties of the CMFs modified asphalt concrete mixture. Morphological and structural analysis of the CMFs were done by scanning electron microscope, Raman spectroscopy and X-ray diffraction. Electrochemical impedance spectroscopy (EIS) technique was used for electrochemical study of asphalt concrete in deicer solutions. The EIS results revealed that a small amount of the CMFs in asphalt concrete mixtures improved remarkably corrosion resistance and increased durability of asphalt pavement. The highest amount of dynamic stability was observed in asphalt concrete with 1.0 wt% CMFs which was about 42% greater than that of without the CMFs. These results indicate that the CMFs were more effective in enhancing the dynamic stability and deformation rate, and reducing the porosity of asphalt concrete. Furthermore, the asphalt uniformity and compaction were improved by the CMFs.

Keywords: Asphalt concrete; Carbon microfibers; Electrochemical impedance spectroscopy; dynamic stability

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