Research on Mechanical and Electrical Properties of Carbon Nanotubes Reinforced Cement-based Materials

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In this paper, the effects of carbon nanotubes on the mechanical and electrical properties of cement-based composites at different ages have been studied. The structures were characterized by SEM. The experimental results show that the higher content of carbon nanotubes may enhance the strength, when the content of carbon nanotubes is 0.1%, the 3d flexural strength increases about 60.6%, 28d strength increases about 57.4%, the 3d compressive strength increases about 33%, 28d strength increases about 11.6%. Highly dispersed carbon nanotubes can form uniform network structure in cement paste, so the mechanical properties of composites can be greatly improved. The conductivity of specimen increase with the content of carbon nanotube increasing, but decline as the content is more than 0.1%, the rate of decline is slow. Carbon nanotube is conductive, they superpose each other and form the conductive network, which can make the cement based material capable of conducting. SEM pictures show that dispersion of the carbon nanotubes in the cement matrix is difficult when the content is more than 0.2%.

Keywords: Mechanical properties, Electrical properties, Carbon nanotube

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