Reflectionloss Properties of TiO2 and Fe3O4 Composite Bulks

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In this project producing composite bulks with TiO2 and Fe3O4 was aimed. Epoxy resin and hardener was used to produce bulks. Then the electromagnetic absorption properties of those materials were characterized. Electromagnetic absorption properties were measured in 8-12 GHz band width, and the measurements were compared to each other. Producing polymers containing ferromagnetic and diamagnetic particles for radar absorption and characterizing those polymers' electromagnetic shielding properties is aimed. Fe3O4 and TiO2 particles were mixed with epoxy resin and 0.75 cm thick bulks were produced. Microwave absorption properties of bulks were measured in 8-12 GHz with Vectoral Network Analyzer (VNA). The Reflectionloss rates are satisfying based on the electromagnetic measurements. A higher Reflectionloss was measured with Fe3O4 bulk. In 8.9 GHz absorption band frequency an overall of 97% Reflection loss was measured. With different concentration of TiO2 samples an overall of 90% absorption rate was measured in 9.3 and 9.27 GHz absorption band frequencies. Fe3O4 composite bulk has 5.3% higher absorption rate than TiO2 composit bulk with same concentration and size. In comparison TiO2 bulk with lower concentration has a 5.9% higher absorption rate than TiO2 bulk with higher concentration. As a conclusion, magnetic properties and concentration of materials has an effect on radar absorption rates.

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