

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.