Synthesis and Analysis of Graphene and Carbon Quantum Dots (CQDs) Composites Based on Epoxy Matrix

Raharjo, Mochamad (School: MAN 2 Kudus)

Currently, aerospace material has developed rapidly, one of which is carbon-based materials. Carbon allotropes that have the potential to be used as aerospace materials are Graphene and Carbon Quantum Dots (CQDs). Synthesis of Graphene, Carbon Quantum Dots (CQDs), and Graphene-Carbon Quantum Dots (G-CQDs) and the manufacture of their composites have been synthesized in this study. Graphene was synthesized using the ultrasonication method from graphite. CQDs were synthesized from rice husks and plastics successfully synthesized using hydrothermal and microwave methods. Graphene, CQDs, and G-CQDs that have been synthesized are used as the basic material for making composites based on an epoxy matrix. The manufactured composites are tested for their mechanical properties. The results of the characterization of CQDs with UV-Vis spectroscopy resulted in a maximum wavelength of 250-365 nm. The XRD spectrum of Graphene shows a sharp peak at 2 theta of 26.30 degrees, while one soft peak in the 2 theta range is 23 degrees and one sharp peak in the 29 degrees area for CQDs material. Based on the results of the texture analyzer test, the addition of fillers can increase the compressive strength of the epoxy matrix-based composites. This research is expected to provide scientific contributions, especially for the development of carbon-based aerospace materials.

Awards Won: