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Quasi Crystal Al (1xxx)/Carbonised Coconut Shell Nanoparticles: Synthesis and Characterisation

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Abstract

A novel synthesis of Al (1xxx)/carbonised coconut shell (CCS) nanoparticles using a ball milling technique was investigated. Initial Al/0.1%CCS powders of an average size of 51.06μm was milled for a period of 70 h. The milled particles at 16, 46 and 70 h were characterized using X-ray diffractomer (XRD), scanning electron microscope (SEM), transmission electron microscope and UV-Vis spectrophotometer. Result revealed that the calculated particle crystallite size from XRD aided with Scherrer's equation is consistent with particle image sizes obtained from SEM aided with software. TEM image depicted variation in orientation and appearance of the Al 1xxx/0.1% CCS nanoparticles at different milling time. The wide variation in the particle size is attributable to different ball impacts on the individual powders during the ball milling process. Increased maximum absorbance observed with the milled particles when compared with the initial powders is an indication of quantum/nanosizing effect due to ball milling.