

## Properties of amorphous carbon microspheres synthesised by palm oil-CVD method

### ABSTRACT

Amorphous carbon microspheres were synthesized using a dual-furnace chemical vapour deposition method at 800–1000° C. Palm oil-based cooking oil (PO) and zinc nitrate solution was used as a carbon source and catalyst precursor, respectively with PO to zinc nitrate ratio of 30:20 (v/v) and a silicon wafer as the sample target. Regular microsphere shape of the amorphous carbons was obtained and a uniform microsphere structure improved as the carbonization temperature increased from 800 to 1000° C. At 800° C, no regular microspheres were formed but more uniform structure is observed at 900° C. Generally the microspheres size is uniform when the heating temperature was increased to 1000° C, but the presence of mixed sizes can still be observed. X-ray diffraction patterns show the presence of oxide of carbon, ZnO phase together with Zn oxalate phase. Raman spectra show two broad peaks characteristic to amorphous carbon at 1344 and 1582 cm<sup>-1</sup> for the D and G bands, respectively. These bands become more prominent as the preparation temperature increased from 800 to 1000° C. This is in agreement with the formation of amorphous carbon microspheres as shown by the FESEM study and other Zn-based phases as a result of the oxidation process of the palm oil as the carbon source and the zinc nitrate as the catalyst precursor, respectively.

**Keyword:** Amorphous carbon; Chemical vapor deposition (CVD); Microsphere; Palm oil; Zinc oxide