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Optical properties of carbon dots derived from table sugar via gamma irradiation

Gamma irradiation is the one method of green environmental synthesis without further treatment waste. Carbon dots are optical nanomaterials in the carbon family with excellent properties such as tunable fluorescence emissions, biocompatibility, non-toxicity, water-soluble and photo-stability. Therefore, this research used gamma irradiation for carbon dot synthesis at room temperatures. The table sugar was used as starting materials without toxic chemicals. Carbon dots were successfully synthesized by gamma irradiation at 25 kGy using the sugar concentrations of 4, 20, and 40% w/v. The effect of gamma doses was also studied for the carbon dot preparation. The chemical composition of the as-synthesized carbon dots was characterized by X-ray photoelectron spectroscopy (XPS), and the optical properties were elucidated by UV-Visible absorption and fluorescence spectroscopy. The as-synthesized carbon dots strongly absorbed in the UV region (271 nm) and exhibited tunable fluorescence emission.

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