Abstract

Carbon nanodots are a new emerging class of carbon allotropes having excellent properties which make them good candidates for different applications. CNDs can be doped with different elements such as N, S, and P. N-doped CNDs have been synthesized by different researchers by using different resources and a variety of methods.

In this work, N-doped CNDs will be synthesized from triethylenetetramine and Penta ethylene hexamine by direct thermal method, studying the effect of using hydrogen peroxide as an oxidant and/or catalyst agent on completion time, product yield, quantum yield and optical properties such as energy bandgap. It was found that the addition of hydrogen peroxide improved the completion time and product yield for both precursors with a minimum of 7 minutes to synthesize CNDs from triethylenetetramine and the highest product yield of 46% for CNDs from Penta ethylene hexamine. About 15% Quantum yield has been attained for CNDs synthesized from triethylenetetramine in the absence of hydrogen peroxide with gradual decay upon the addition of H_2O_2. The presence of H_2O_2 also affects the energy bandgap of CNDs prepared from triethylenemelamine with a slight decrease upon its increase.

The FT-IR and XPS acquisition have proved the saucerful synthesis of N-doped CNDs from both precursors, that was clear from the higher percentage of nitrogen element about 17 at. % and the nitrogen functional groups existed on the CNDs surfaces.