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Pratap Vishnoi, Madhulika Mazumder, Manaswee Barua, Swapan K. Pati,
C.N.R. Rao

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Phosphorene quantum dots

Pratap Vishnoi, Madhulika Mazumder, Manaswee Barua, Swapan K. Pati, C. N. R. Rao*

New Chemistry Unit, Theoretical Sciences Unit

International Centre for Materials Science and Sheikh Saqr Laboratory

Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur P. O., Bangalore-560064

(India).

*Corresponding author. E-mail: cnrrao@jncasr.ac.in

Abstract. Phosphorene, a two-dimensional material, has been a subject of recent investigations. In the present study, we prepared blue fluorescent phosphorene quantum dots (PQDs) by liquid phase exfoliation of black phosphorus in two non-polar solvents, toluene and mesitylene. The average particle sizes of PQDs decrease from 5.0 to 1.0 nm on increasing the sonicator power from 150 to 225 W. Photoluminescence spectrum of the PQDs is red-shifted in the 395-470 nm range on increasing the excitation-wavelength from 300 to 480 nm. Electrons donor and acceptor molecules quench the photoluminescence, with the acceptors showing more marked effects.

Keywords. Phosphorene quantum dots, liquid phase exfoliation, blue photoluminescence, photoluminescence quenching

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