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Room temperature ionic liquid assisted synthesis of highly stable amorphous Se nanoparticles: A Rapid and facile methodology

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Abstract

Herein, Selenium (Se) nanoparticles are synthesized in the host matrix of a *neat* imidazolium based room temperature ionic liquid (RTIL) by a rapid and facile approach at mild conditions. From the microscopic imaging studies, the size of the nanoparticles was determined to be 45 ± 5 nm with globular morphology. XRD and TEM studies revealed the amorphous phase of the Se nanoparticles. This was further evident from the Raman mapping of the nanoparticles. Interestingly, the well-known amorphous to crystalline phase transformation of Se nanoparticles was found to be much slower (> 2 months) in RTIL compared to *few minutes-to-days* as reported in earlier studies. The underlying mechanism for the formation of the nanoparticles and their phase stability has been explained taking into account of the structural and the fluidic aspects of the RTIL.

Keywords: Amorphous materials; Selenium; Nanoparticles; Ionic liquids; Phase transformation

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