

## Facile Control of Size and Morphology for PbSe Nanocrystals via Slow Colloidal Growth

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Colloidal PbSe nanocrystals have been the focus of recent synthetic interest largely due to the size-tunability of their gap through the near infrared. In addition, various properties, such as carrier multiplication, carrier lifetime and et cetera, can be enhanced by the morphology of nanocrystals. However, conventional synthetic methods remain challenging to achieve these.

In this research, we report finely size-tuned PbSe nanocrystals and morphologically controlled PbSe nanosheets via simple control of reaction parameters. The approach involves slow injection of precursors with excess amounts of oleic acid. Retarded growth, due to both the slow supply of precursors and the surfeit of oleic acid, causes attachment of PbSe nanocrystals through the (110) planes, the most reactive planes, into a two-dimensional geometry. In contrast, such attachment process can be prevented by impurities, e.g., Cd chalcogenide (CdSe or CdS) nanocrystals dispersed in chloroform, resulting in the growth of monodisperse PbSe nanocrystals.