

## Electronic supplementary information (ESI)

### A Novel single source precursor: [*bis*(*N*, *N*-diethyl-*N*'-naphthoyl-selenoureato)palladium(II)] for palladium selenide thin films and nanoparticles

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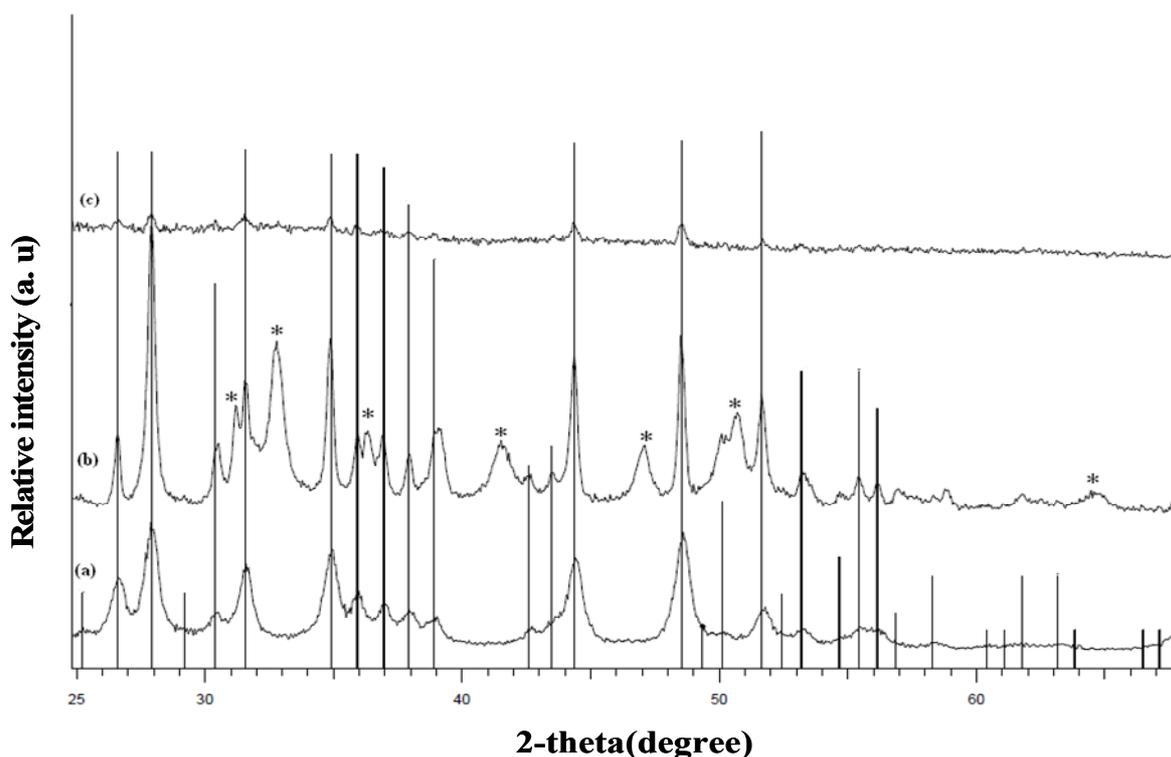


Figure S-1. XRD pattern of as-deposited nanoparticles of palladium selenide (a) dodecanethiol (DDT) (b) oleylamine (OA), (c) in a mixture of oleyl amine(OA): dodecanethiol(DDT)1:1. The marked lines correspond to predominate phase Pd<sub>17</sub>Se<sub>15</sub> (ICDD: 00-029-1437) and peaks designated by \* correspond to palladium selenide (PdSe<sub>2</sub>) (ICDD: 01-072-1197)

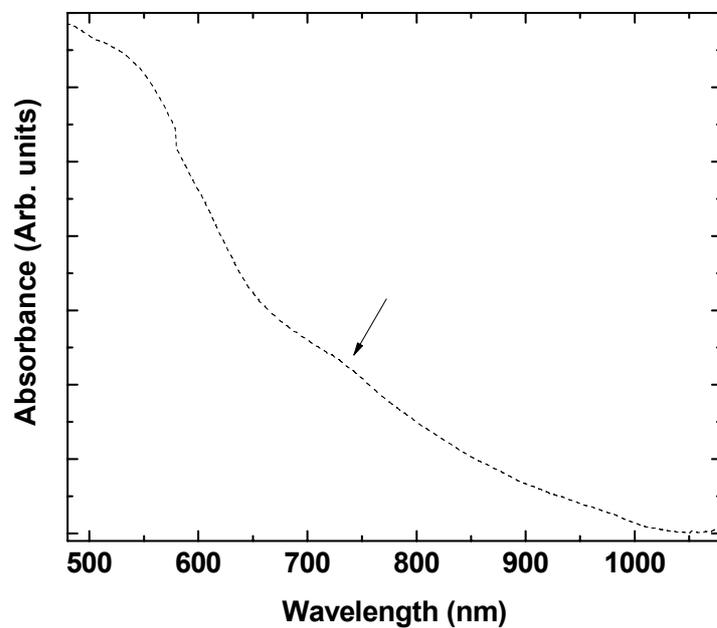


Figure S-2. UV/Vis spectrum of palladium selenide nanoparticles suspended in toluene prepared in oleylamine(OA) at 240 °C for 1 hour.

The nanoparticles of palladium selenide were prepared by solution thermolysis in oleylamine (OA) and dodecanethiol (DDSH) as solvent. The as-prepared palladium nanoparticles in oleylamine showed the band edge at 925 nm calculated from absorption spectrum. TEM images of nanoparticles synthesized in OA showed very thin hair like crystallites entangled in a network (Figure S-3)). The inset in the Figure S-3(a) shows the selected area electron diffraction (SAED) pattern which demonstrates the crystallinity of these structures. TEM images of nanoparticles grown from dodecanethiol (DDSH) show irregular structures forming chains (Figure S-3 (b)). Inset in show Fast Fourier Transform (FFT) pattern which confirm the crystallinity of these structures.

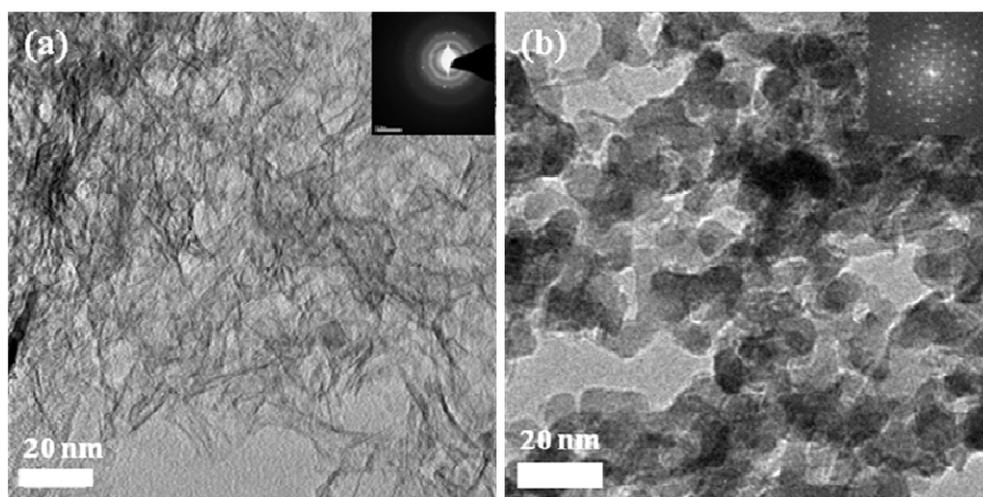


Figure S-3. TEM images of palladium selenide nanoparticles prepared (a) in oleylamine (OA) at 240°C for 1 hour, the corresponding inset shows the selected area electron diffraction(SAED) pattern of thin hair like structures (b) palladium selenide nanoparticles prepared in dodecanethiol (DDSH) at 240°C for 1 hour and corresponding inset show FFT image