Supplementary material

S1. p-XRD pattern for iron selenide nanocrystals (a) from complex [Fe{(SePr$_2$)$_2$N}$_2$] (3) and (b) from complex [Fe{(SePh$_2$)$_2$N}$_2$] in hexadecylamine at 240 °C respectively.

S2. EDX analysis of iron selenide thin films deposited at (a) 500, (b) 550 and (c) 600 °C from complex [Fe{(SePr$_2$)$_2$N}$_2$] onto silicon substrate.
S3. 3D interferometer images of iron selenide thin films deposited at (a) 500, (b) 550 and (c) 600 °C on silicon substrate from complex [Fe{(SePPr$_2$)$_2$N}$_2$] (3).

S4. 3D AFM images of iron selenide thin films deposited from complex ([Fe{(SePPh$_2$)$_2$N}$_2$]) (4) at (a) 500, (b) 550 and (c) 600 °C respectively.
S5. Histograms showing average roughness and Rms roughness of the iron selenide thin films deposited from complex \([\text{Fe\{SePPh}_2\text{N}_2\}\text{]}\) (4) at (a) 500, (b) 550 and (c) 600 °C onto the silicon substrate.