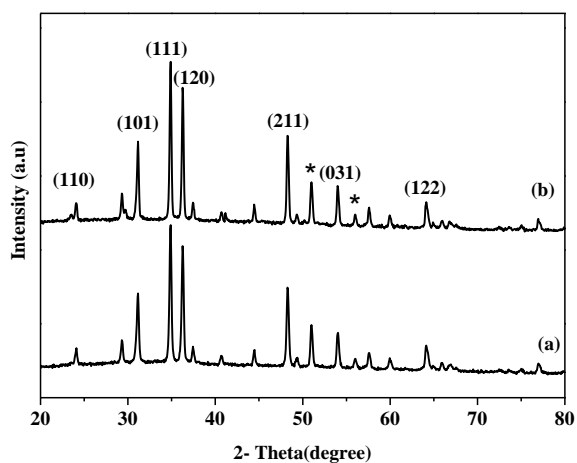
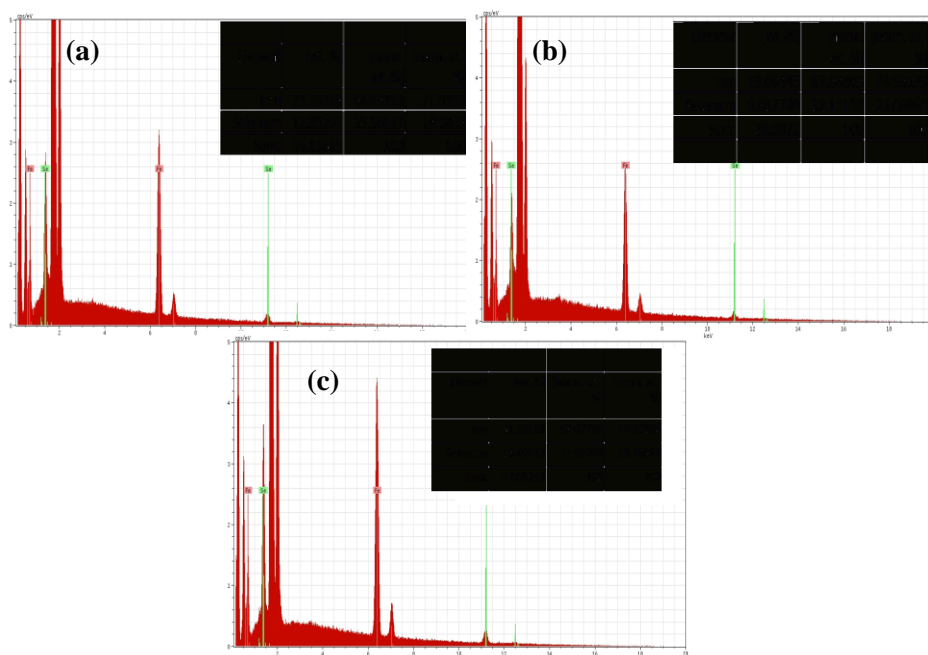


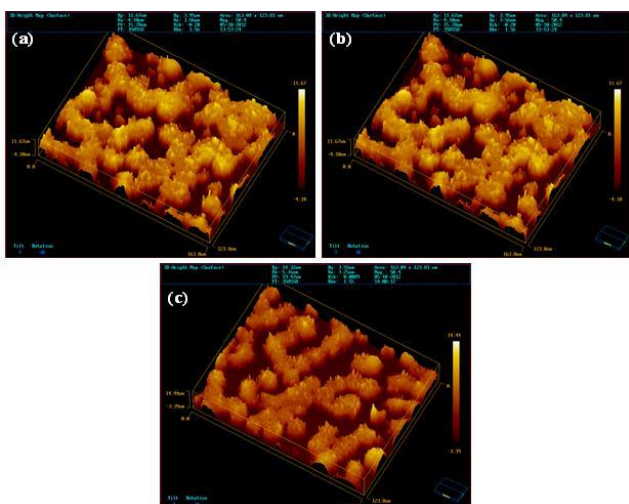
## Supplementary material



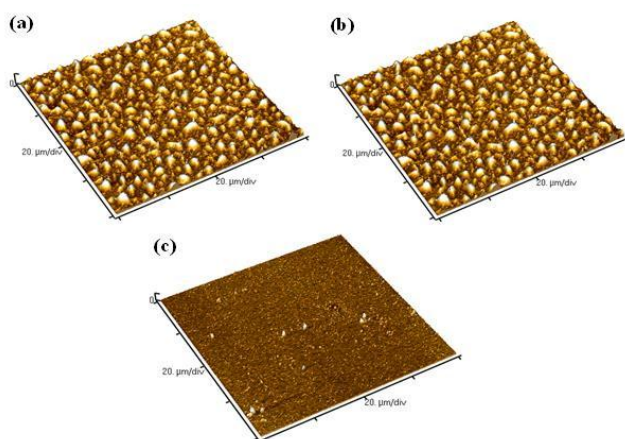
S1. p-XRD pattern for iron selenide nanocrystals (a) from complex  $[\text{Fe}\{(\text{SeP}^i\text{Pr}_2)_2\text{N}\}_2]$  (**3**) and (b) from complex  $[\text{Fe}\{(\text{SePPh}_2)_2\text{N}\}_2]$  in hexadecylamine at 240 °C respectively.



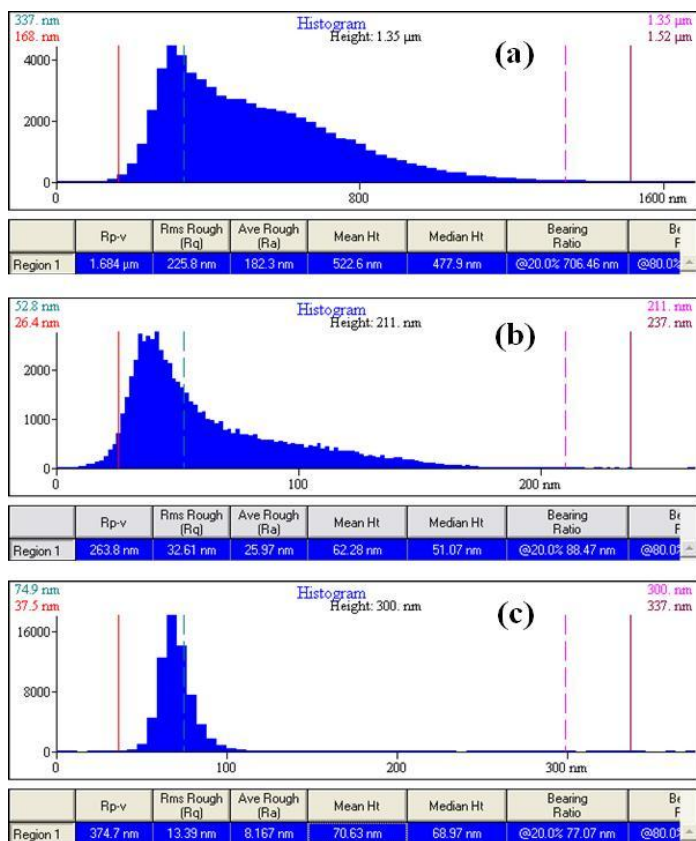
S2. EDX analysis of iron selenide thin films deposited at (a) 500, (b) 550 and (c) 600 °C from complex  $[\text{Fe}\{(\text{SeP}^i\text{Pr}_2)_2\text{N}\}_2]$  onto silicon substrate.



S3. 3D interferometer images of iron selenide thin films deposited at (a) 500, (b), 550 and (c) 600 °C on silicon substrate from complex  $[\text{Fe}\{(\text{SeP}^i\text{Pr}_2)_2\text{N}\}_2]$  (**3**).



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