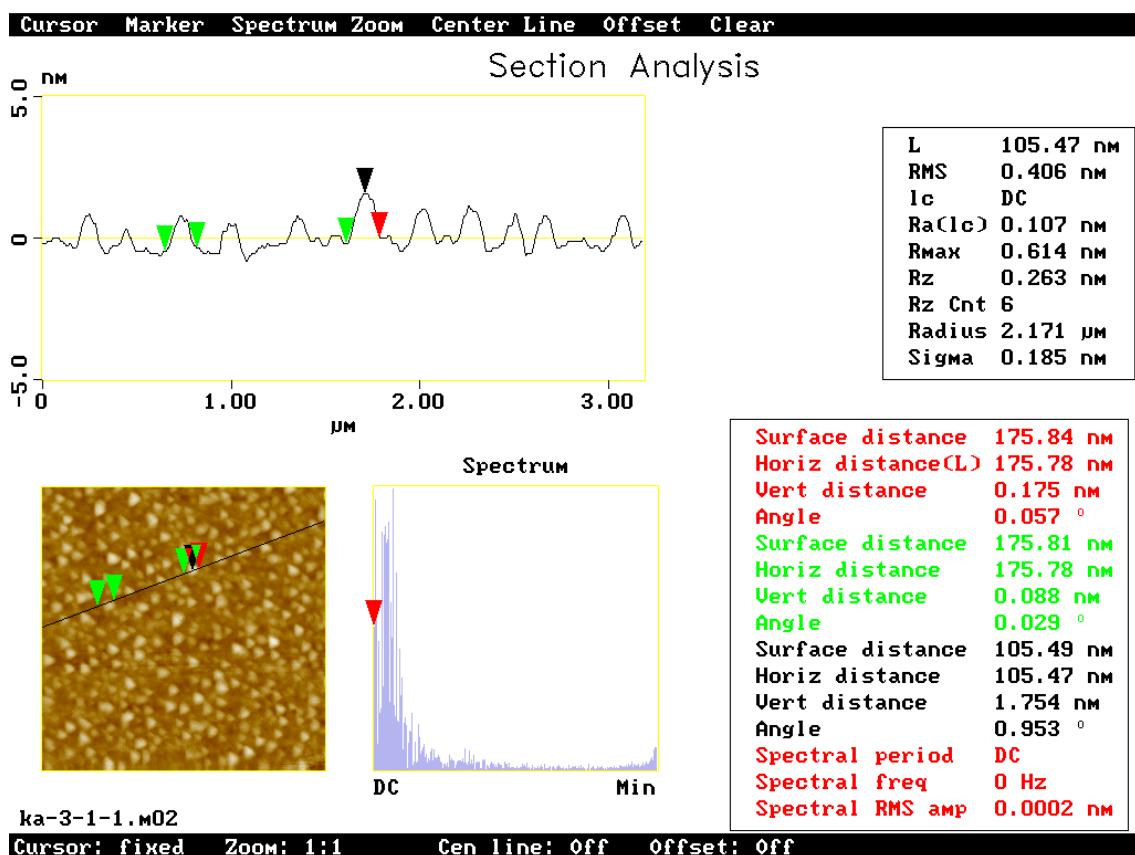
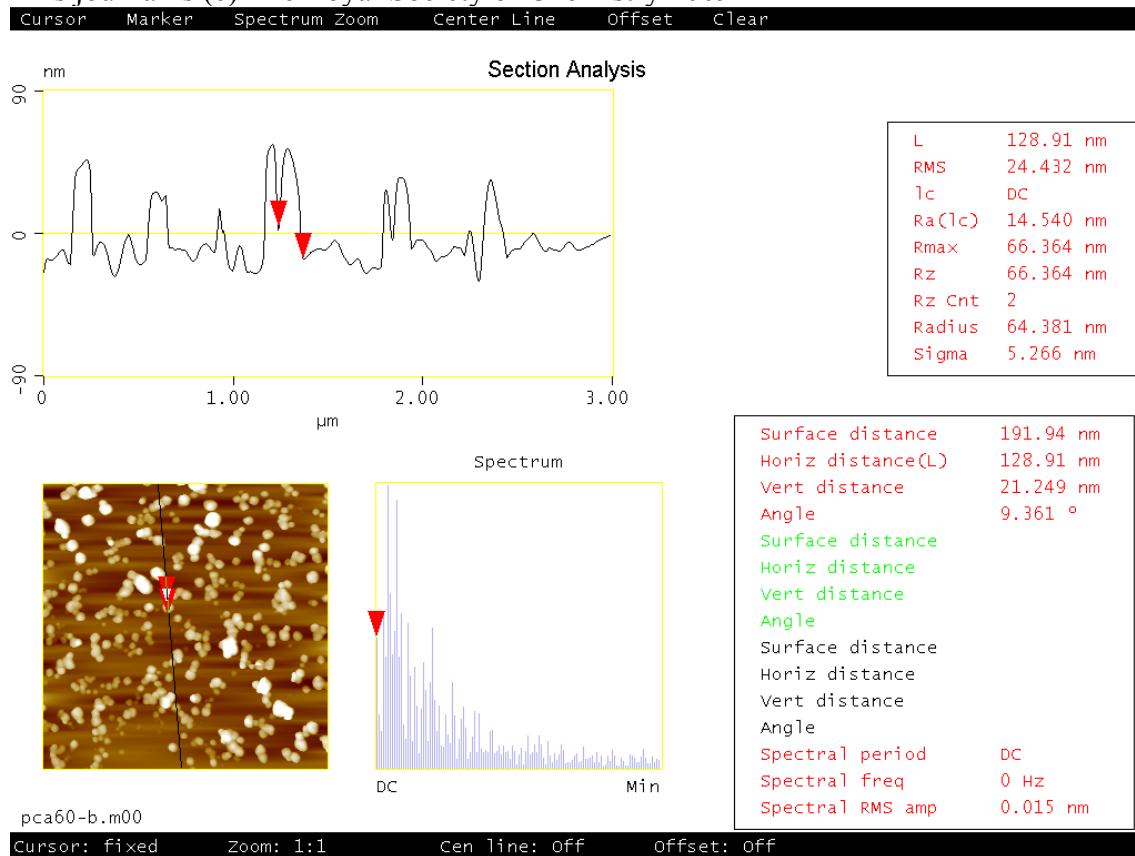
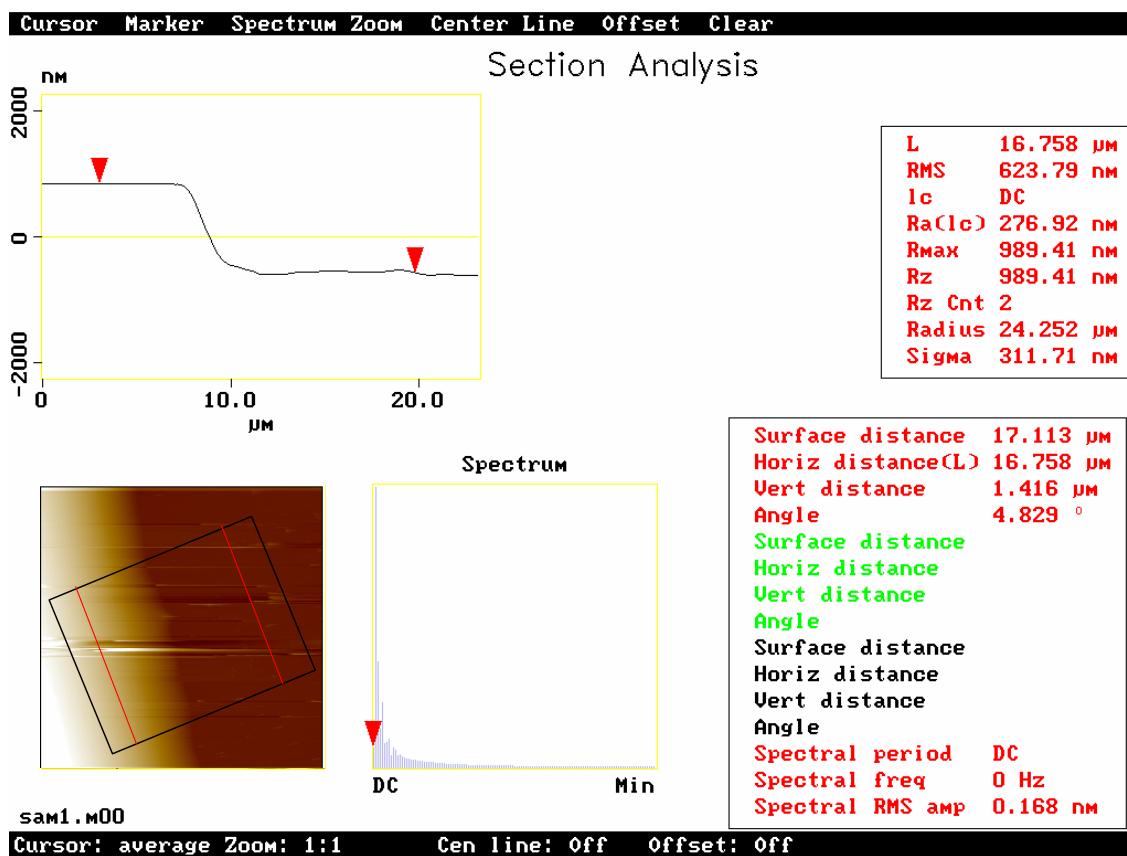


**Supplementary information**

**Figure 1** AFM section analysis for mesoporous  $\text{TiO}_2$ -loaded  $\text{SiO}_x:\text{ZrO}_x$  film.



**Figure 2** AFM section analysis for of  $\text{SiO}_x:\text{ZrO}_x$  film loaded with meso- $\text{TiO}_2$ /(PEI/PSS)<sub>2</sub> containers.



**Figure 3** AFM section analysis for edge of TiO<sub>2</sub>-SiO<sub>x</sub>:ZrO<sub>x</sub> film.