Nanostructured titania powders have been prepared by sol-gel method sintered at different thermal treatments (250 to 700 °C), during different periods of times. Nanostructured ceramic powders contained beta-TiO$_2$, anatase, rutile and/or the coexistence of all of them, as shown in Fig. 1. A phase transition to the anatase phase and to the rutile phase of TiO$_2$ occurred gradually from 250 to 500 °C and from 500 to 700 °C respectively. The average crystallite size increased from 10 nm to 100 nm.

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Figure 1: a) XRD patterns of nanostructured TiO$_2$ powders sintered at different thermal treatments.

Figure 2: TEM image of TiO$_2$ powders treated at 700 °C during 240 min, showing crystals of rutile.