SYNTHESIS AND CHARACTERIZATION OF NANOCRYSTALLINE TITANIUM NITRIDE POWDER FROM ANATASE

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In this research, nanosized titanium nitride powder was synthesized through reaction of titanium oxide with ammonia gas. The reaction was carried out at a very slow heating rate. The starting powder contained anatase phase with crystallite size of 200 nm and surface area of 7 m^2/g. Obtained results revealed that surface area of anatase decreases with increasing temperature. TiN powder synthesized at 1000°C had crystallite size of 40 nm, surface area of 31 m^2/g and particle size of 39 nm. SEM observations of samples at 800 and 1000°C showed that the morphology of TiN was similar to that of the starting powder (TiO_2). The bright field image from TEM analysis for the sample synthesised at 1000°C confirmed the fully crystalline nature of the TiN particles which were about 50 nm.

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Figures:

Fig1. SEM micrograph of TiO_2

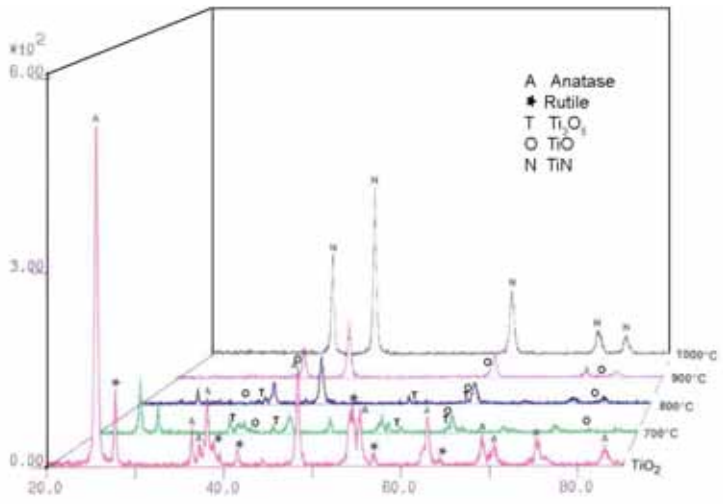
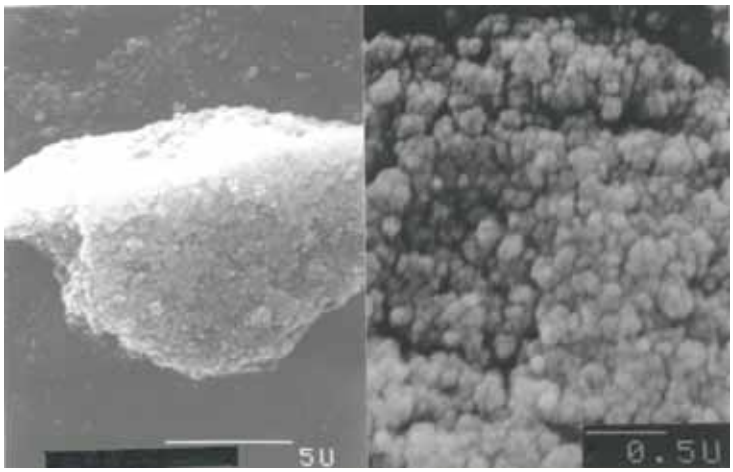
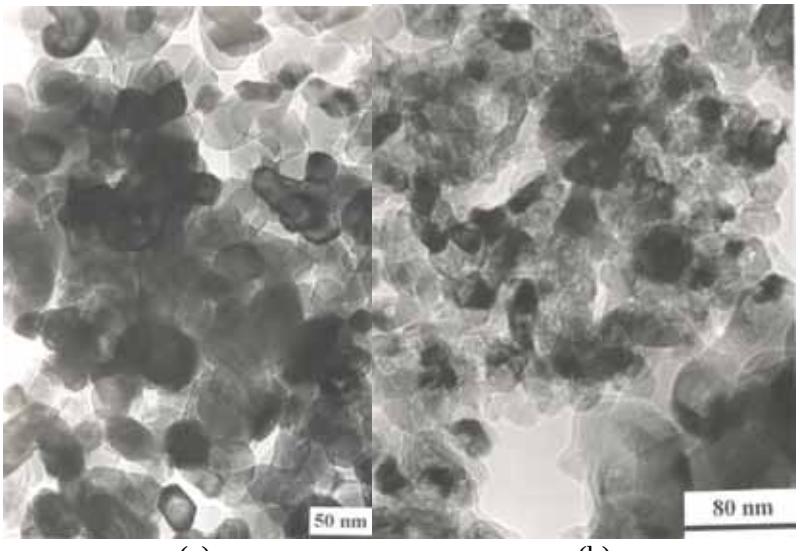


Fig2. X-ray patterns of synthesized sample at different temperatures



(a) (b)

Fig3. SEM micrographs of synthesized powder (a) at 800°C (b) at 1000°C



(a) (b)

Fig4. TEM micrographs of sample synthesized (a) at 800°C (b) at 1000°C