**Synthesis of titanium dioxide nanoparticles via sucrose ester micelle-mediated hydrothermal processing route**

ABSTRACT

Titanium dioxide nanoparticles were synthesized via low-temperature sucrose ester micelle-mediated hydrothermal processing route using titanium isopropoxide as the precursor. X-ray diffractometer revealed that the samples possessed a mixed crystalline phases consisting of anatase and brookite in which anatase was the main phase. Upon increasing the hydrothermal reaction temperature, the degree of crystallinity of the nanoparticles improved and their morphology transformed from bundles of needles to rods and to spheres. Photocatalytic behaviour of the as-synthesized nanoparticles was investigated by photodegradation of methylene blue solution in an ultraviolet A irradiating photoreactor. The as-synthesized nanoparticles exhibited higher photocatalytic performance as compared to the commercial counterpart.

**Keyword:** Hydrothermal; Nanoparticles; Photocatalyst; Sucrose ester; Titanium dioxide