

Photocatalytic Study of Rose Bengal Dye using Sol-gel Synthesized Titanium dioxide incorporated with Transition metal elements (Manganese and Cobalt)

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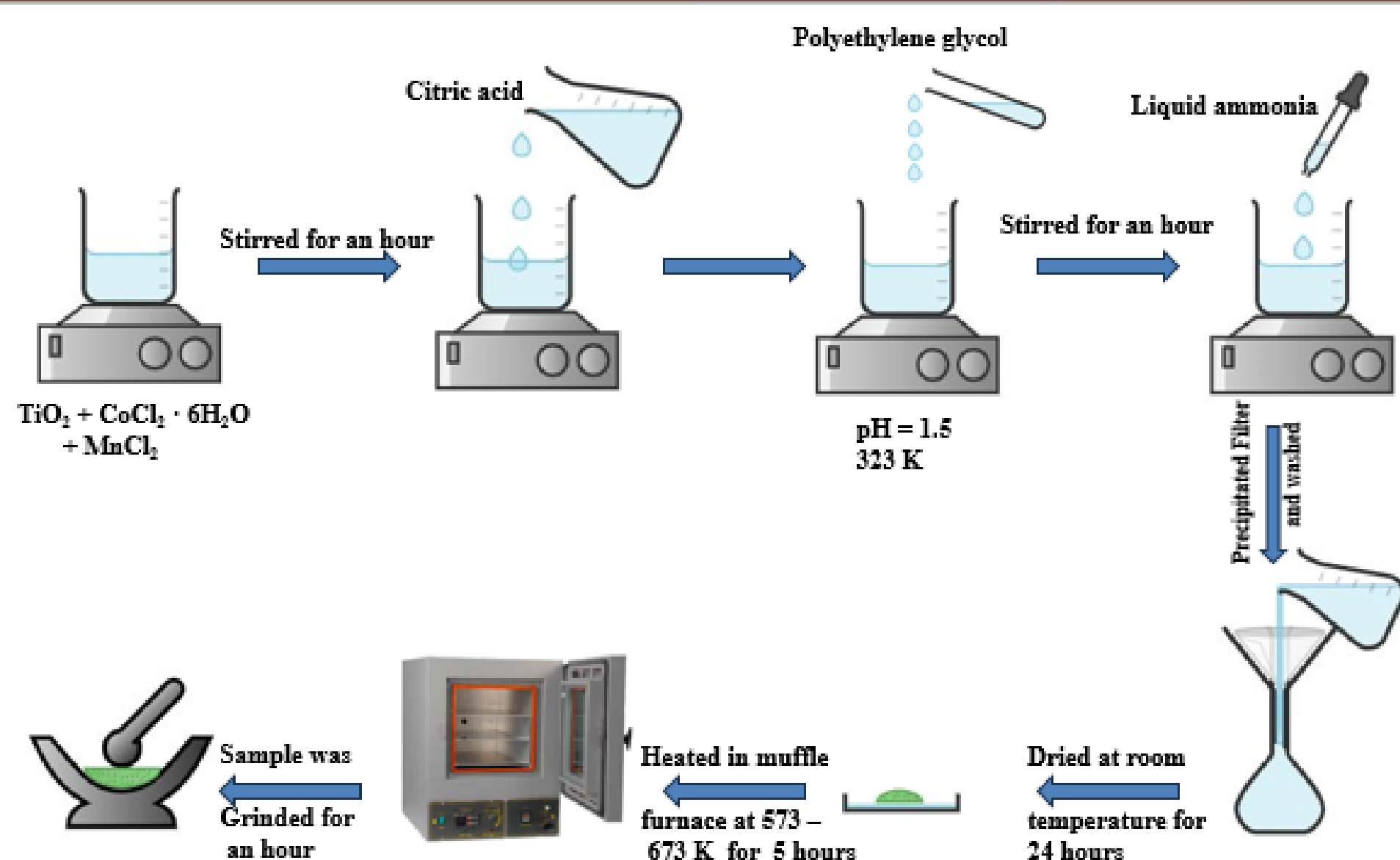
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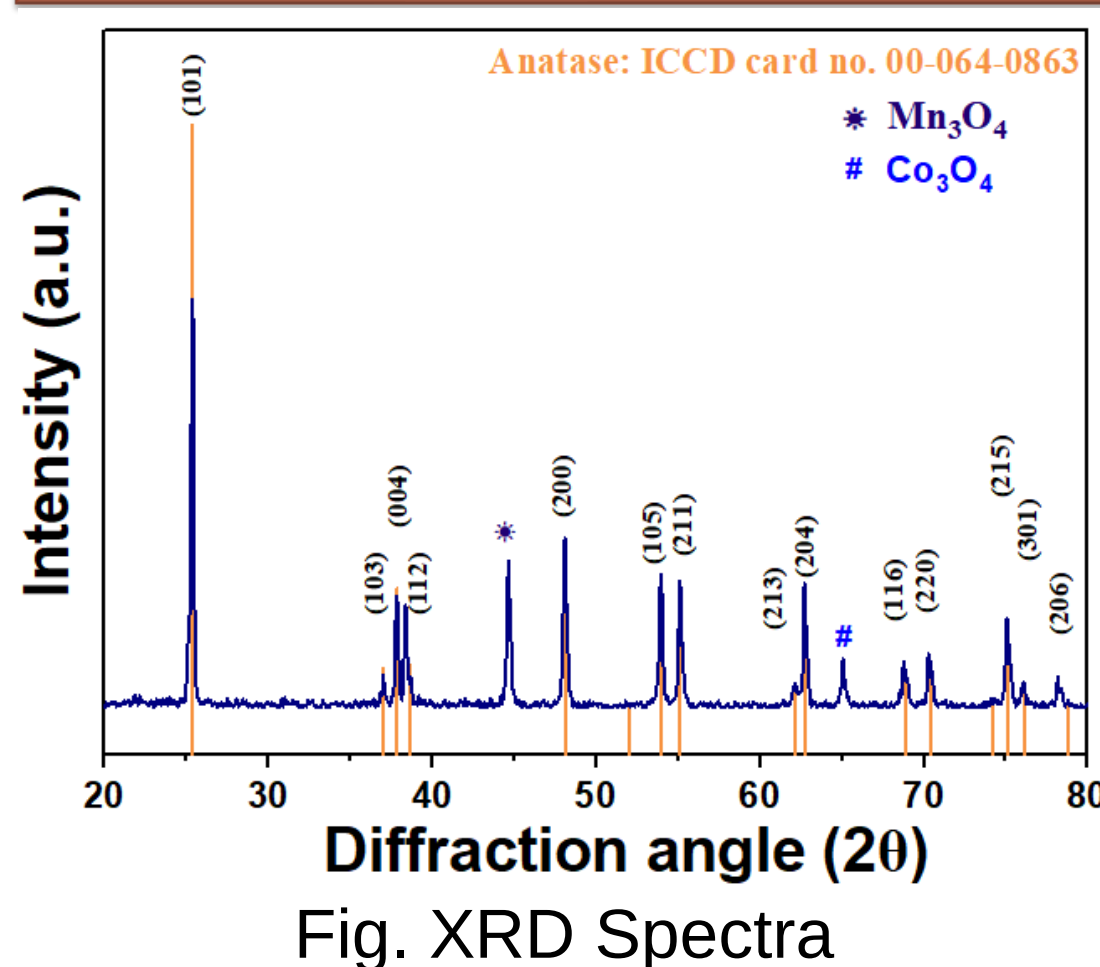
INTRODUCTION & AIM

- TiO₂ is a very promising photocatalyst and has been extensively studied.
- Transition metal ions doping not only affects the band gap, increases the optical absorption in visible range, but also leads to change in the oxidation state and redox potentials as well as structural parameters, which play a primary role in the photocatalytic activity.
- The TiO₂/Mn-Co composites were prepared via a sol-gel route.
- Characterization of produced samples has been performed and photocatalysis experiments were conducted using a model rose Bengal (RB) dye reaction using UV-VIS spectrometer.

METHOD



RESULTS & DISCUSSION

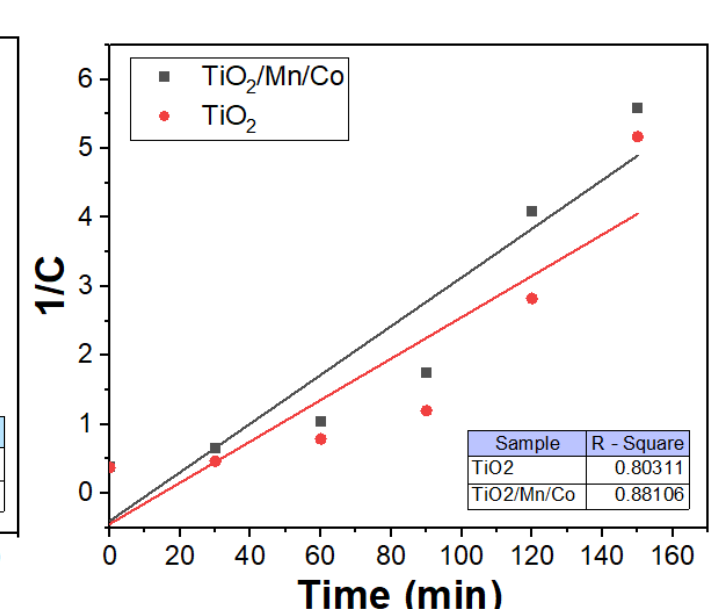
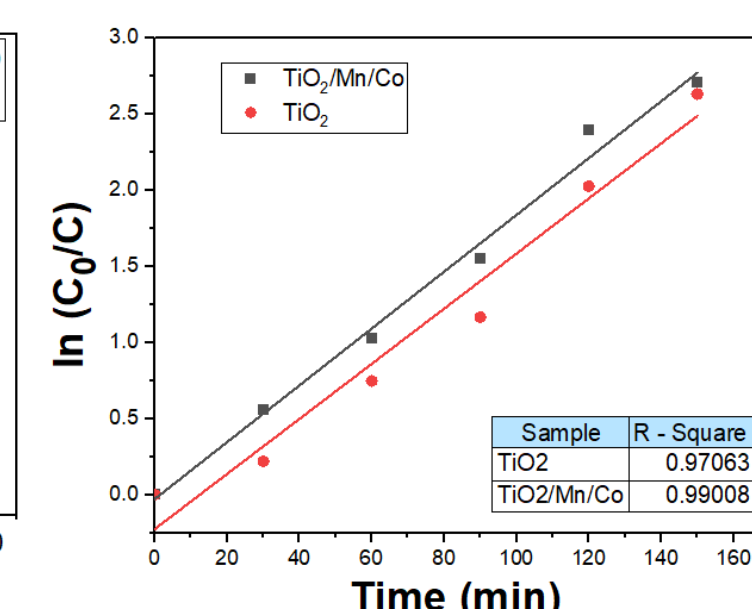
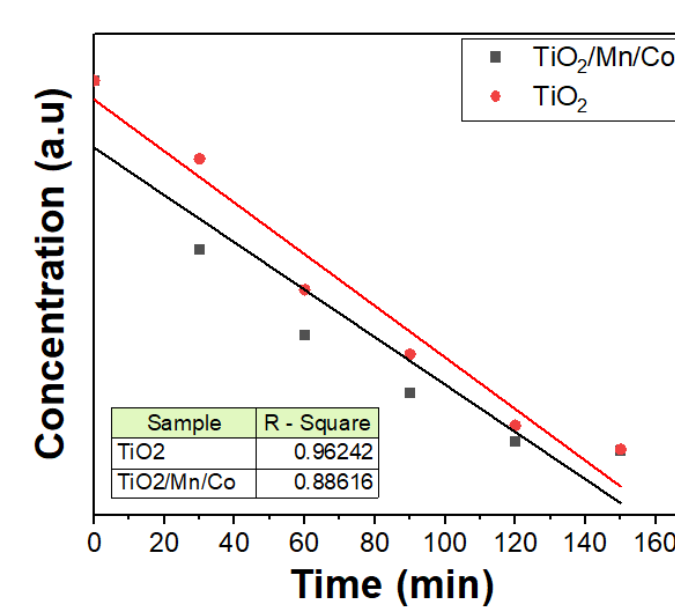
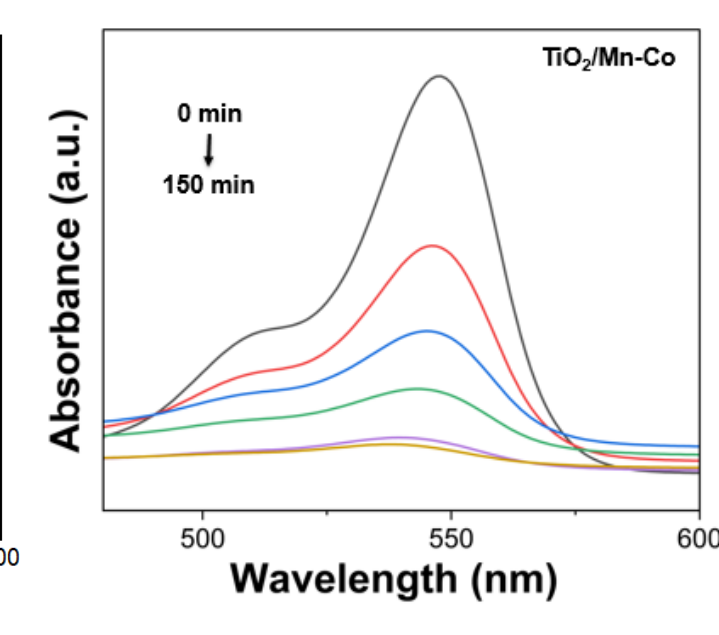
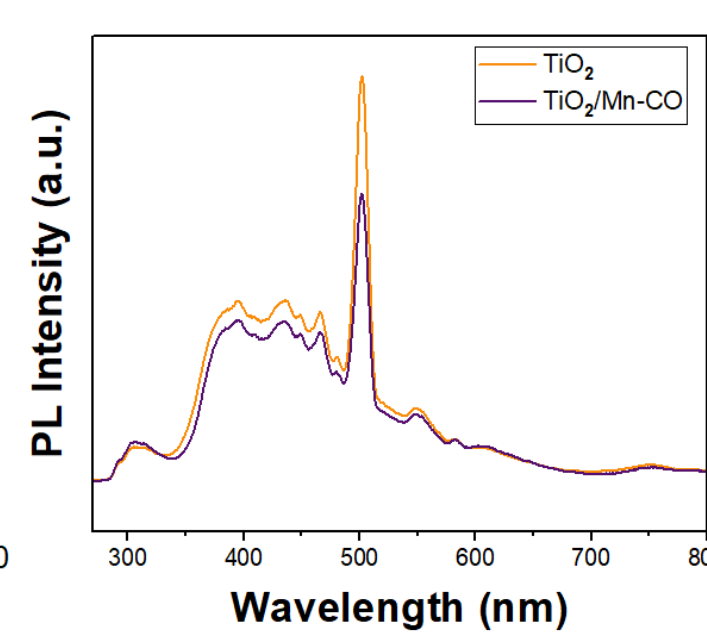
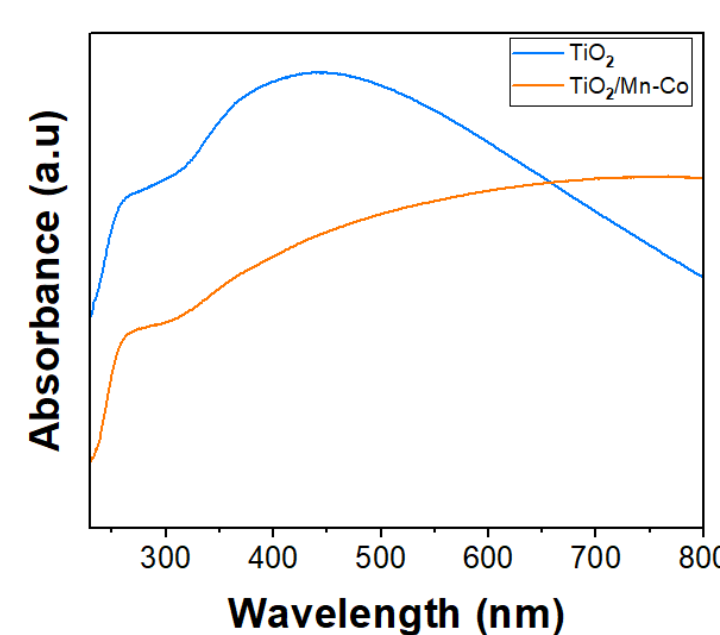
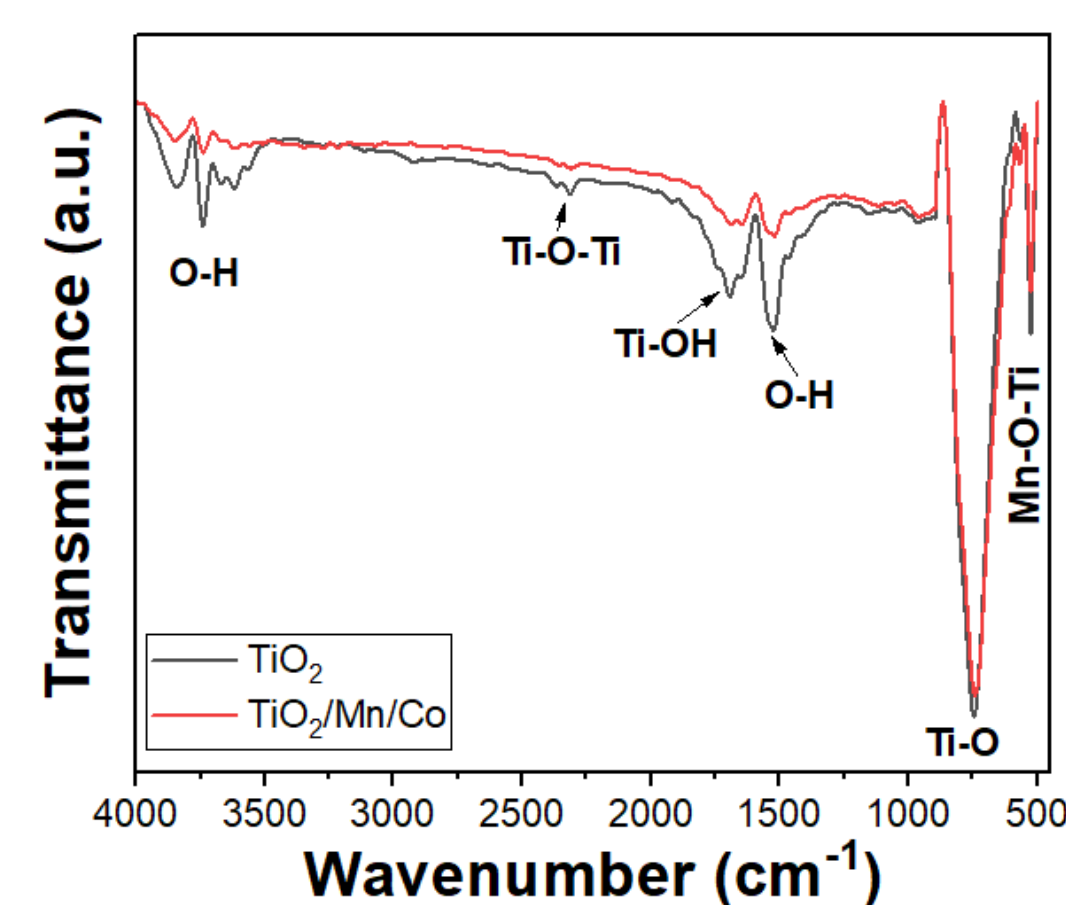
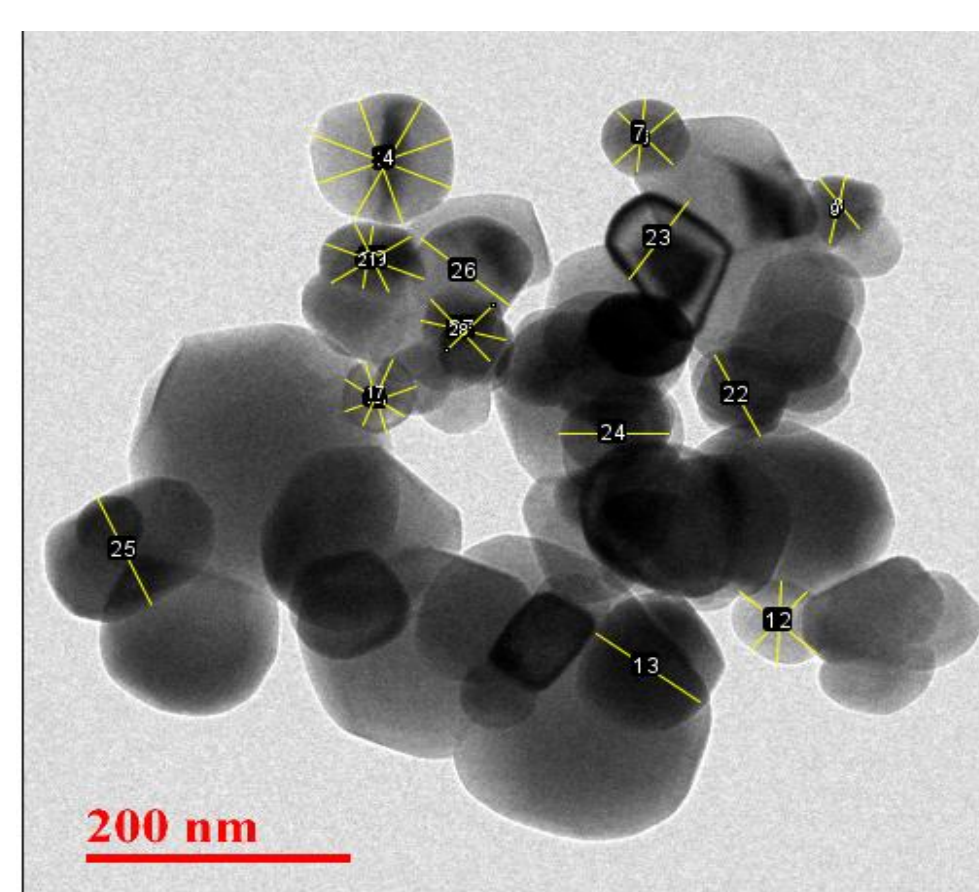


- The crystallite size is 2 nm.
- The values of lattice parameters are: $a=b=0.3782$ nm, $c=0.9513$ nm.
- The values of lattice parameters confirms the tetragonal structure of TiO₂.
- The interplanar d-spacing was 0.3567 nm.

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RESULTS & DISCUSSION



CONCLUSION

Results showed that

- XRD confirmed the successful incorporation of dopants into the TiO₂ lattice and crystallite size was found to be 2 nm.
- TEM revealed uniformly distributed nanoparticles diameters.
- The degradation efficiency of RB dye was 92% in the case of TiO₂ and increased to 94% with TiO₂/Mn-Co nanocomposite.

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