

# Nanocomposites and nanomaterials

## Photodegradation of Malachite Green using surface modified nickel doped TiO<sub>2</sub> nanocatalysts

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We synthesized nickel doped TiO<sub>2</sub> nanocatalysts under mild hydrothermal conditions (p = autogenous, T = 100°C, t = 12 hr). Nickel oxide and *n*-butylamine were used as dopant and surface modifier respectively. The samples dried were characterized using powder XRD, FTIR, zeta potential, SEM, and EDAX. The batch experiments of photodegradation of malachite green were performed under UV and sun light irradiation. We systematically investigated the effect of operational parameters including nanocatalyst dosage, pH, contact time, initial concentration of dye solution, and light source. We found that surface modified nickel doped TiO<sub>2</sub> nanocatalysts had better photodegradation efficiency compared with reagent grade TiO<sub>2</sub> under both UV and sun light irradiation. The optimum photodegradation efficiency for photodegradation of malachite green dye solution was found to be at pH = 8, nanocatalyst dosage = 1.2 g/l, contact time = 120 min, and initial dye concentration = 250 mg/l.