

## THESIS INFORMATION

Title: STUDY ON SYNTHESIZING Ag/TiO<sub>2</sub>, Ag-Ni/TiO<sub>2</sub> BY  $\gamma$ CO-60 IRRADIATION METHOD FOR PHOTOCATALYTIC DEGRADATION OF ORGANIC DYES.

Major: Chemical engineering

Major code: 62520301

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### The aim of thesis:

- This thesis studied the preparation and characterization of Ag/TiO<sub>2</sub>, Ag-Ni/TiO<sub>2</sub> photocatalysts by  $\gamma$  irradiation method from Co-60 source.
- The resulted photocatalysts were further investigated the photocatalytic activity toward the decomposition of organic compounds: rhodamine B and methyl red. Thereby, the explanation of the increase of photocatalytic activity of Ag/TiO<sub>2</sub> and Ag-Ni/TiO<sub>2</sub> compared with the original TiO<sub>2</sub>.

### Thesis's contribution:

- The thesis successfully synthesized Ag nano modified TiO<sub>2</sub> photocatalyst by  $\gamma$ Co-60 irradiation method. This method satisfies clean production requirements and can be applied to large- scale production. The modified Ag/TiO<sub>2</sub> nanoparticles composing of 0.5 to 2.0 wt% of Ag in the composition revealed the co-existence of the TiO<sub>2</sub> anatase and rutile phase with size of 20 - 40 nm and the Ag metallic phase with size of 1-3 nm. The band gaps lower than the pristine TiO<sub>2</sub> substrates.

- $\text{TiO}_2$  were modified by nano Ag and Ni using  $\gamma$  irradiation from the Co-60 source for the first time. The characteristics of Ag-Ni/ $\text{TiO}_2$  material composing of 0.75 to 3.0 wt% of Ag and Ni in the composition indicated two phases of anatase and rutile of  $\text{TiO}_2$  and Ag and Ni metallic phase with size of 1-3 nm. The band gap were lower than that of  $\text{TiO}_2$ .
- Ag/ $\text{TiO}_2$ , Ag-Ni/ $\text{TiO}_2$  photocatalysts have increased the photocatalytic activity compared to the original  $\text{TiO}_2$  (P25) and they can remove organic pollutants completely (rhodamine B). Besides, Ag/ $\text{TiO}_2$ , Ag-Ni/ $\text{TiO}_2$  catalysts are highly reusable.
- The thesis also optimized of rhodamine B photodegradation process by Ag/ $\text{TiO}_2$  and gave a mathematical model to show the dependence of degradation efficiency of rhodamine B according to the influencing factors (reaction time, concentration of rhodamine B, pH, content of catalysts).

Scientific advisors

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