RESEARCH

COBALT NANO-CATALYST

HIGHLY ACTIVE LAYERED DOUBLE HYDROXIDE-DERIVED COBALT NANO -CATALYSTS FOR p-NITROPHENOL REDUCTION

BENEFITS

Highly active
Cost efficient
Reusable

KEYWORDS

Nitroaromatic Reduction,
Nano Catalyst,
Non-Precious Metal Catalyst

APPLICATIONS

Industrial water Treatment

IP

PATENT PENDING

PARTNERSHIPS

LICENCE AND/OR R&D COLLABORATION

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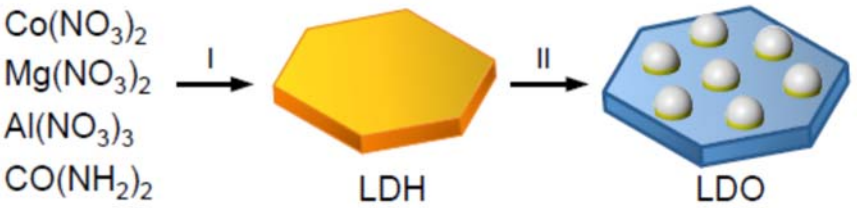
BACKGROUND

P-nitrophenol is a Clean Water Act priority pollutant, which has an acceptable daily intake (ADI) of 0.32 mg per day over a month. The toxicity of p-nitrophenol can be lowered significantly to p-aminophenol, which has a negligible ADI of 4.55 mg per day over lifetime.

The department of Civil & Environmental Engineering and Earth Sciences at the University of Notre Dame has developed a nano-catalyst based on cobalt that surpasses all the cobalt-based catalysts reported so far in the literature in remediating P-nitrophenol. This is achieved by affixing Co nanoparticles on two-dimensional layered double oxide (LDO) nanodisks through thermal phase transformation of cobalt-magnesium-aluminum layered double hydroxide precursors



YOUR NEEDS

If you need to :

- Reduce the cost associated with catalyst fabrication and restocking
- Develop catalysts for water treatment and environmental remediation
- Replace noble metal catalysts by non-precious metal catalysts

The Cobalt Nano catalyst can help you

KEY BENEFITS Vs STATE OF THE ART

Several catalysts for water treatment exist but they use very expensive precious noble metals such as palladium (Pd) and platinum (Pt). A solution is to replace precious metal by non-precious metal such as cobalt. But catalysts using the latter are usually much less reactive than those made of precious metals, suggesting a discouraging economic loss if cobalt is used to replace palladium to remediate p-nitrophenol Now with our method :

- LDO-Co is highly active in catalyzing P-nitrophenol reduction
- The reactivity of LDO-Co is at least 49 times that of previous Co catalysts
- The reactivity ratio of LDO-Co and Pd surpasses the price ratio of Co and Pd by 9.3 times
- Affixing cobalt nanoparticles on LDO prevent the nanoparticles from being aggregated
- High reactivity of LDO-Co remains after repeated reuse

DEVELOPMENT STATUS

We have successfully synthesized LDO-supported cobalt nanoparticules from Co-Mg-Al hydrotaclite by thermal phase transformation