

Title (14)	:	Effect of pH solution on photodegradation of 2,4,6-trichlorophenol via co-beads catalyst
Journal	:	AIP Conference Proceedings
Document Type	:	Conference Paper
Publisher	:	AIP Publishing
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Link to Full Text	:	https://pubs.aip.org/aip/acp/article-abstract/2923/1/040025/3279798/Effect-of-pH-solution-on-photodegradation-of-2-4-6?redirectedFrom=fulltext
Link to Scopus Preview	:	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85190680387&doi=10.1063%2f5.0195474&partnerID=40&md5=53d8ebade4767186f976ace9bf39b8d5
Abstract	:	A novel of Co-beads catalyst was successfully synthesized, and the modification of these beads significantly boost their permeability, rigidity, chemical resilience, hydrophilicity, and biocompatibility. The obtained dry sample was characterized by Fourier Transform Infrared (FTIR) to analyze the functional groups present in the sample. Absorption spectra of the sample was recorded using Nicolet iS10 FTIR spectrophotometer the wavenumber range from 4000 to 400 cm⁻¹ to study the chemical bonding of the mixture in the sample. Co-beads catalyst were prepared with a ratio of cobalt oxide and sodium alginate of 1:1, respectively and the ability of the Co-beads catalyst to photodegrade 2,4,6-trichlorophenol from aqueous solutions in a batch medium were performed. The photocatalysis of Co-beads catalyst showed the maximum photodegradation of 2,4,6-trichlorophenol achieved at 60.3% within 2h at pH 5 in 2.0 g of wet beads, 20 mg/L of concentration in 100 mL of solution. In short, the fabrication of Co-beads catalyst might provide a new tool for addressing water treatment challenges.