Catalytical degradation of haloacetic acids (HAA) in H_2/CO_2/Xe-UV system – Advanced Reduction Process (ARP) for wastewater treatment

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Significance and Relevance

Advanced reduction processes (ARPs) define a novel approach for water treatment using non-toxic reagents and catalysts to degrade harmful pollutants present in treated stream. Water pollution by haloacetic acids (HAAs) is a major environmental problem for which ARPs provide a novel solution. The possibility of treating water with carbon dioxide, commonly present in the atmosphere, makes ARPs doubly beneficial for the environment and people.

Preferred and 2nd choice for the topic: Degradation of persistent pesticides in CO_2 /HCOOH/Xe-UV – Advanced Raduction Process (ARP) for wastewater treatment

Preferred presentation: (Oral only **/** Oral preferred or Short Oral / Poster): Oral or Poster.

Introduction and Motivations

Advanced reduction processes (ARPs) represent an emerging approach to wastewater treatment, serving as an alternative to the extensively studied advanced oxidation processes (AOPs) [1-3]. The application of ARPs in water treatment, particularly through the use of catalysts and hydrogen while utilizing carbon dioxide, offers a modern and potentially effective method for degradation of water contamination. This approach is especially relevant for the degradation of haloacetic acids, which are primarily generated as byproducts of water disinfection involving chlorine-based compounds, as well as from industrial activities [4, 5].

Results and Discussion

Trichloroacetic acid was selected as the representative chemical compound for HAA, which is the most common pollutant from HAA group in water. The carbon dioxide-based process achieved >99% TCAA degradation and >90% dechlorination in 20 minutes. Degradation study and chloride concentration were studied by ion chromatography. The presented process is an excellent method to purify water from HAA using carbon dioxide. Further research in the paper was extended to investigate catalysts (metal-based on activated carbon) to further improve and reduce the time of treatment.

References

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