

REDUCTIVE TECHNOLOGY USING RANEY ALLOY FOR QUICK AND EFFECTIVE DEGRADATION OF HALOGENATED ORGANIC COMPOUNDS IN CONTAMINATED WATERS

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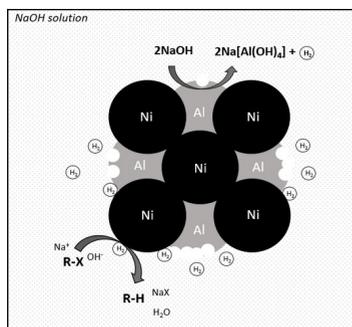
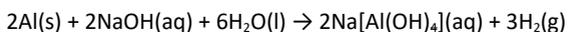
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Halogenated organic compounds collectively referred as AOX (Adsorbable Organic Halides) are one of the most widespread groups of water contaminants (wastewaters, surface waters, ground waters). Reasons are both historical and industrial. Historical reasons include use of wide range of halogenated chemical compounds for preparation of solvents, degreasers, pesticides, flame retardants, and technical liquids in the past. Industrial reasons are that some of these substances are still used in many sectors of industry (paper, textile, chemical etc.). Due to their environmental persistence and potential toxicity, these substances have become subject of strict controls in surface and waste water. Therefore, there is a need of their elimination from these types of water. This can be achieved via utilization of fast and effective technologies.

This study is focused on development of technology based on strong reducing properties of Al-Ni 50:50 wt. % alloy (Raney alloy) in alkaline water environment for degradation of persistent halogenated organic compounds directly in contaminated waters. The mechanism involves the catalytic hydrodehalogenation reaction on the surface of porous nickel by the action of hydrogen gas produced in-situ during aluminum dissolution step (see following equation and picture).



The proposed technology was subsequently applied for degradation of halogenated organic substances directly in contaminated waters under ambient temperature and atmospheric pressure. For purpose of verification, a special technological device for water treatment in large volumes was constructed and verified on model water samples as well as on a wide range of real waters (industrial wastewater, groundwater, landfill water). In all cases, significant

degradation of all monitored halogenated contaminants, including even persistent forms, was observed within a few hours.

The use of Raney Al-Ni alloy for degradation of halogenated organic substances directly in contaminated waters under alkaline conditions thus seems to be a very promising method especially for treatment of heavily contaminated waters.