Electrochemical processes for water decontamination
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Environmental pollution control has become one of the
global ever-increasing important tasks, especially for
those biorefractory and toxic pollutants abatement. In
recent years, the applications of electrochemistry for
environmental pollution abatement have been thoroughly
investigated, and the feasibility of electrochemical
conversion/destruction of organic substrates in
wastewater has attracted much attention. The main
advantage of this technology is its environmental
compatibility, versatility, high energy efficiency,
amenability of automation and safety because it operates
at mild conditions. Great efforts have been paid to sound
electrode materials exploration, efficient processes and
novel reactor development, as well as typical organic
pollutants degradation mechanism investigation. At
present, electrochemical technologies have reached such a
state that they are not only comparable with other
technologies in terms of cost, but sometimes they are
more efficient and compact.

This work summarized our recent works in this
area to enhance electrochemical treatment efficiency in
view of engineering application, including anode and
cathode material development, degradation mechanism,
novel electrochemical technologies and reactors. Special
attentions would be paid to the reaction, mass transfer
characteristics and scale up for application. These
processes and reactors greatly enriched electrochemical
technologies and their application for environmental
remediation.

Keywords: environmental electrochemistry, wastewater
treatment, electrochemical oxidation, electro-Fenton,
photoelectrocatalysis