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## Supercritical water oxidation reactor with a corrosion-resistant lining

**Inventors:** Naufflett;  
George W.  
Oxon Hill  
MD  
Farncomb;  
Robert E.  
Accokeek  
MD  
Kumar, M.  
Lalith  
Pittsburg  
PA

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**Assignee** The United  
(s): States of  
America as  
represented  
by the  
Secretary  
of the Navy  
Washington  
DC

### Abstract

A supercritical water oxidation reactor includes a vessel with an interior surface, two cooling sections, a heat exchanger, an oxygenating section, a pump, and a trap. The interior surface of the vessel has a corrosion-resistant, artificial ceramic or diamond-like coating. The artificial diamond coating is thin and crystal-like in structure. The heat exchanger is located between the two cooling sections. The heat exchanger and the two cooling sections surround the exterior of the vessel. The oxygenating section comprises a porous cylindrical baffle positioned within the vessel. The porous baffle transfers oxygen, hydrogen peroxide, or other oxygenating substances to an aqueous hazardous waste introduced into the reactor.

In accordance with another aspect of the invention, the oxygenating section includes a shaft having a helical extension. The shaft has a corrosion-resistant, artificial diamond or diamond-like coating on its outer surface. The shaft rotates the helical extension to assist in removing solids from the aqueous