

Novel feeding method in supercritical water oxidation

Supercritical water oxidation (SCWO) refers to the oxidation of organic matter, dissolved or suspended, in an aqueous phase at pressures and temperatures above the critical point of water (374 °C and 221 bar). Under these conditions, organics are oxidized at very high reaction rates. This often leads to complete conversion of the organics into CO₂ and clear useable water at reaction times as short as a few seconds. Challenges for the successful design and operation of SCWO reactors for concentrated waste and slurries treatment have included corrosion, charring and fouling of heat exchanger surfaces, process control of the highly exothermic reaction. This invention is concerned with a solution to some of the lingering problems in the field of supercritical water oxidation for waste treatment, i.e., the charring of the waste undergoing treatment, the resulting fouling of the heat exchanger during conventional heating, the corrosion of the reactor and heat exchanger prevalent in the subcritical to supercritical transition zone, and the control of potential temperature spikes in the reactor. This invention describes a novel flow and feeding scheme that avoids these issues, and thus reduces operating costs while expanding the range of applications for supercritical water oxidation in particular for sludge or slurries treatment.

Patents

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