"Advanced oxidation processes of wastewaters and their role in water reuse for a circular economy"

23 september 2022, 11:30 h
Faculty of Chemical Sciences, Aula QC04

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About the seminar

Nowadays, closing the loop in water management it's mandatory; the processes aimed at water reuse, especially for industrial uses, play a major role in the Circular Economy perspective. Among the available wastewater treatment techniques, those based on advanced oxidation processes (AOPs) appear to be of particular relevance. AOPs are chemical treatment methods for the removal of toxic and refractory micropollutants from wastewaters by oxidation with hydroxyl radicals (·OH) which are produced by using ozone (O3), hydrogen peroxide, UV light, ultrasounds and hydrodynamic cavitation (HC). This last technique has shown tremendous promise for several applications in water, energy, and specialty chemicals sector; HC is recognized to be a non-waste and environmentally friendly technology. In this presentation, a state of the art of the different water reuse plants located in Europe is presented, including some experimental results on advanced oxidation processes applied to the treatment of wastewaters from different sources; great attention will be given to hydrodynamic cavitation, with the discussion of some case studies (treatment of liquid wastes containing Phacs, dyes or other industrial pollutants), in the view of a circular economy for water.

A few words about the speaker

Graduated in Chemical Engineering at the University of Napoli Federico II; *Ph.D.* in Chemical Engineering. Actually, Full Professor of Chemical Plants at the Department of Industrial and Information Engineering and of Economy (DIIIE), L'Aquila University, and Head of the Laboratory of Chemical Plants.

Professor Prisciandaro teaches Chemical Plants I (Bachelor of Science in Industrial Engineering), Chemical Plants II (Master of Science in Chemical Engineering), and Environmental Chemical Engineering (Master of Science in Engineering for the Environment and the Territory).

The research activity's core subjects are in the field of chemical and environmental engineering and are mostly applied to flue gas treatment and the treatment of civic and industrial wastewaters. The investigations are focused on removing and/or degrading polluting pollutants, recovering by-products, and conserving and reusing water in the context of a circular economy. The experimental techniques used are membrane processes (ultrafiltration and reverse osmosis), advanced oxidation processes (Fenton, hydrodynamic cavitation, combined treatments), crystallization from solutions, and adsorption. In addition to experimentation, the research activity includes process simulation using specialized software (Aspen Plus, Aspen Hysis, ChemCad, SuperPro Designer), with the goal of improving the technical and economic optimization of chemical processes and their efficient management in terms of water and energy consumption.