

## **MEMBRANES IN WASTEWATER TREATMENT: INTEGRATED CRYSTALLIZATION IS ESSENTIAL**

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Saline wastewater, often containing inorganic as well as organic material, is produced in various contexts and is very difficult to treat, particularly with the additional challenge of a low/high pH and the presence of heavy metals. In this context the developed world (industrial) meets the developing world (mining) and growth countries like China (mining and industry).

The aim of this presentation is to propose a feasible integrated system to reclaim water from saline wastewater or wastewater containing metals for water reuse, to regenerate acid/base from wastewater and to recover metals or salts as precipitates. At first, the feasibility of a hybrid system consisting of a fluidized pellet reactor and an electro dialysis (ED) unit will be discussed to treat simulated and real wastewaters, mainly in view of recovery of the phosphate fraction. A fluidized pellet reactor can be used to remove the scaling potential before ED treatment; or directly to precipitate phosphates or heavy metals. This requires a profound knowledge of the water chemistry in terms of supersaturation of minerals, which can be studied using geochemical equilibrium software. The potential for such hybrid systems will be outlined.