



## **Re-Salt: Recycling of Industrial Salt-laden Process Water**

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Among other raw materials, clean fresh water is one of the most important resources to enhance life on earth. Hence, the protection and sustainable management of our water resources has to be considered as an indispensable issue. In consequence, the closure of the natural water cycle is fundamental but includes economic and ecological challenges. The joint project Re-Salt<sup>1</sup> (**Recycling of industrial salt-laden process water**), funded by the German Federal Ministry of Education and Research (BMBF), focusses on recirculation of salt-laden wastewater from chemical industry.<sup>2</sup> Thus the aim is to use the recycled water which contains high concentrations of sodium chloride for redirecting it to chlor-alkali electrolysis, the most important industrial process to produce chlorine. The two crucial requirements for such recovery are the removal of dissolved organic impurities followed by a subsequent concentration of the sodium chloride content. For an efficient purification, granular Activated Carbon (Donau Carbon) provides essential adsorption abilities. To facilitate an enhanced adsorption/desorption process, the effects of electrochemical polarisation (DECHEMA Research Institute) and chemical modification (University Duisburg-Essen) of the adsorbent are studied. These two approaches require corresponding methods of trace analysis in a concentrated sodium chloride matrix and consequently an installation of online testing probes in future reactors (TZW Karlsruhe). The resulting diluted salt solution will be concentrated with high pressure reverse osmosis (EnviroChemie, TH-Köln) and membrane distillation (SolarSpring, Covestro). All these concepts will be combined and tested with real process water, ideally creating a new working concept in raw material recovery. In conclusion, the recycling of saline process water may regain two valuable resources: purged water for further process usage plus a micropollutant free high concentrated sodium chloride solution, which again can be utilized in the chlor-alkali-electrolysis.

[1] Project Partners: Covestro, EnviroChemie, DECHEMA-Forschungsinstitut, Donau Carbon, SolarSpring, TH Köln, TZW Karlsruhe, Universität Duisburg-Essen.

[2] For more information and details, see: a) <http://www.bmbf-wave.de/de/1435.php>;

b) <http://resalt.web.th-koeln.de>.