**Abstract:**
Electrodionization (EDI) has been accepted as an advantageous alternative to conventional mixed-bed ion-exchange technologies in the production of high purity water worldwide. The greatest potential of the process is to further treat reverse osmosis (RO) permeate to produce 5 to 18 MΩ cm resistivity water. The process typically removes more than 99% of strong electrolytes and carbon dioxide from water and is also capable of removing high portions of silica, boron, etc. from water in these applications. EDI can be also effective in the treatment of waters with a higher TDS of up to ~1000 mg/L. Furthermore, the salt removal is always lower than that obtained in the treatment of RO permeate grade or better quality water and lower than that obtained with RO in most cases but always higher than that obtained with electrodialysis (ED) operating in a continuous single-pass mode. For example, EDI-X module available from MBDA s.r.o. removes more than 70% of salt from a feed solution containing 500 mg/L of ammonium nitrate at a nominal product flow rate in a single hydraulically stage. Further, EDI can operate at a high water recovery of 90 to 95% as opposed to 75% of RO and 85% of ED for water treatment applications and is lower in investment costs than both RO and ED. In addition, RO can have low rejection for some ions such as nitrates while EDI removes all strong electrolytes. Thus, EDI can be used as a final demineralization step in combination with RO and ED to reduce product TDS and investment costs and to increase the overall water recovery. The only limitation to the EDI process is that it requires good pretreatment to avoid scale formation and fouling. We have proposed a hybrid technology for treatment of ammonium nitrate based wastewater with a TDS of 2,000 to 8,000 mg/L. The technology combines continuous single-pass ED, EDI operated in a feed-and-bleed mode and ED. Using this technology, it is possible economically to produce demineralized water containing a few mg/L of ammonium nitrate on the other hand.

**Principle of electrodionization**

**High-purity water production: Laboratory application**

**Industrial modules – Performance in continuous single-pass mode**

**High-purity water production: Application in power generation industry**

**Application in the treatment of ammonium nitrate containing steam condensate**

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