

Past, Present And Future Of Ceramic Membranes

Gilbert Galjaard, Christian Goebbert, Nanostone Water Halberstadt/Germany

This presentation will discuss ceramic membranes for the drinking water industry in general. Starting with a definition and some history to create a background. Followed by the advantages, disadvantages compared to polymeric membranes and recent developments that combined has led to a noticeable increase in applications since 2014. Recent adjustments in membranes and technology has led to overall lower costs or made it possible to integrate treatment steps. A good example of new technology was the Ceramac design of PWNT for Metawater membranes leading to quite a jump in total installed capacity. Or the relatively new segmented ultrafiltration monolith of Nanostone Water suitable to retrofit existing polymeric plants, leading to a rapid implementation on sites where polymeric membranes failed. Especially the combination of ozone on the surface of the ceramic membrane has potential to combine treatment steps while preventing flux decline by membrane fouling. Also a recent new approach by utilities looking more to life cycle costs instead of capital costs has been of major importance for the increase in applications. What the future will bring is always difficult to assess. Still a lot can be done by looking differently to ceramic membranes than just an absolute barrier for suspended matter. These membranes are in example the ideal contactors for ozone leading to lower ozone dosages and contact time than standard ozone contactors. Surface charge effects are unexplored, and can besides sometimes unpleasant surprises also bring new opportunities like the removal of Bromate. Pre-treatment applications for seawater desalination will definitely increase the coming years. While polymeric membranes will continue to dominate the drinking water sector a further positive shift in the market share of ceramic membranes can be expected. This since utilities worldwide will rely more and more on difficult to treat sources with challenges ceramic membranes will be able to address