

# Challenges in Application of Ceramic Materials for Sustainable Water Treatment and Wastewater Recycling

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Recently, ceramic materials have been used widely for reduction of environmental impacts in forms of filter media, adsorbents and ceramic membranes in order to produce clean water and/or reclaimed water as well as to recover valuable materials from wastewater. The advantage of ceramic membranes are such as longer life of usage, high strength, and ease of cleaning. From our research work on the application of ceramic membrane in the anaerobic membrane bioreactor (AnMBR) system to treat industrial condensate wastewater, it was found that high efficiencies of COD removal at different HRTs from 3 to 8 days could be achieved with this integrated ceramic membrane system. Methanosaeta were found as the main archaea community in the AnMBR system. The ceramic membrane can be used to separate biomass and colloids in the system efficiently. High quality of treated water could be obtained by the system. Moreover, another application case of ceramic membrane on polyvinyl alcohol (PVA) recovery from desizing wastewater in textile industry also showed high potential of complete PVA recycling from industrial wastewater at low transmembrane pressure at least 2 bars. The membrane cleaning could be easily done using jet water flushing throughout the research investigation period. Therefore, the use of ceramic membrane will be challenging for water and wastewater treatment to achieve sustainable water and wastewater management in the near future.