

# Ceramic Membranes for Water Treatment:

## *Technical Status and Economic Updates*

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Ceramic membranes formed the subject for the BlueTech Tracker™ webinar series on 18<sup>th</sup> November 2010. For a number of years ceramic membranes have been used in niche applications, but have not been able to compete with polymeric membranes for main-stream applications such as ultrafiltration for drinking water treatment, or for membrane bioreactors. Ceramics have been considered to be the preserve of money no-object applications, in which the impressive combination of mechanical, chemical, and thermal stability has been key. Recently however there are signs that this may be changing with a number of companies coming to market with solutions incorporating ceramic membranes in the water and wastewater field. Will this be a game –changer in the industry? Are ceramic membranes economic for water treatment?

The webinar included presentations from international technology experts and market leaders. Firstly Enrico Vonghia of GE-Water in Canada gave an overview of the wide range of ceramic products in the marketplace. The membranes included multi channel monoliths, tubes, and hollow fibres, though it is the former category that is making an impact in drinking water treatment.

### **Ceramics appear to achieve better performance than polymerics in terms of flux stability & water quality**

The basics of ceramic membrane performance were then discussed by Stefan Panglisch of IWW, Germany. Stefan showed data which indicated that **ceramics achieve better performance than polymerics in terms of flux stability and treated water quality**. The stability of performance seems to be due to the wider channel diameter, which gives better hydrodynamic uniformity. Also it allows the use of an explosive backwash procedure, with high velocities and high pressure air to eject the backwash concentrate. In addition, ceramics have an advantage in having a hydrophilic surface chemistry, and this seems to be the reason for the improvement in treated water quality, since it facilitates a better removal of dissolved organics.

### **Ceramic Membranes are becoming Cost Competitive in terms of Total Treated Water Cost**

The presentations were rounded off by two talks from the US with Scott Freeman of Black and Veatch and Emily Gilbert of Veolia-Krueger discussing pilot plant experience and the economics of recent bids. Scott showed that total treated water cost is becoming competitive now that the ceramic membrane price has fallen to around twice that of polymeric membranes. Emily described a competitive bid at Watsonville in California in which ceramic membranes won against competition from polymerics.

**Based on current price points and likely decreases in cost as market volumes increase, Ceramics could cause a radical shift in the membrane market in the next decade**

50 minutes of presentations were then followed by a lively debate on a whole range of topics. A wide variety of technical subjects were raised to explore process design issues and applications. However, the **economic comparison from the drinking water project** sparked the most interest. A clear conclusion is that pricing has fallen to the level where ceramic membranes can be taken seriously. Furthermore, if ceramics can achieve such close price competitiveness without having yet achieved significant market volumes, the future indicates potential for a major turn round in the membrane industry in the long term.

The Ceramic Membrane Webinar has provided insight into the field of membrane applications in water treatment, indicating that this sector could undergo a radical shift in the next decade.