

Novel Nanofiber Technology for Filtration and Separation of Polar Liquids
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Abstract

Any new technology cannot be fully exploited and its benefits realized until innovative researchers, systems designers and device manufacturers understand its fundamental operating mechanism and general attributes. Alumina nanofiber technology filters a wide range of submicron contaminants from polar liquids not by mechanical means but through a positive electrokinetic potential the emanates from the nanofibers themselves. At the nano scale, many common materials exhibit strange and unexpected properties. Not only is the total surface area of nanofibers extraordinary large, nearly half of all the atoms comprising the fibers are on the surface of the fiber itself! In polar liquids the fibers have an Al+++ charge which generates an electrical field which adsorbs submicron contaminants on the surface of the nanofibers. This paper will discuss properties of the media as related to reduction of inorganic particulates, pathogens, cellular debris and metals from water. It will also provide data on coalescence as well as examples of chromatographic separation at less than 1 bar pressure that are normally achieved only using HPLC.