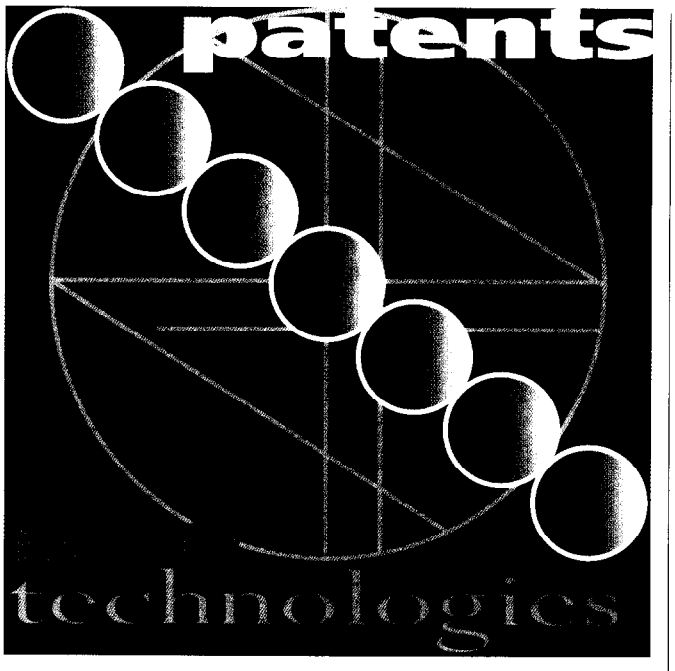
Emulsion stabilising membrane

Fraunhofer Institute of Interfacial Engineering and Biotechnology, Stuttgart, Germany, has been able to create stable and homogenous emulsions at room temperature, after devising a method that uses membranes.

It is well known that oil and water do not mix and requires energy-intensive rotor-stator systems, high pressure or ultrasound homogenisers to form a stable emulsion. In the new process, oil flows along the outside of a tubular ceramic membrane under a pressure of 4 bar. The oil passes through the membrane forming droplets of less than 1 µm in diameter. Water flowing through the inside of the membrane then picks-up the droplets of oil to form a stable and homogenous emulsion. The major benefit of the process is that it has significantly reduced energy consumption than conventional dispersion systems. The membrane system can be sterilised with steam and filters out microorganisms, making it suitable for producing pharmaceutical and cosmetic lotions.



Stimulating bugs to reclaim land

A new project being carried out at the University of Sunderland, UK, will look at ways to stimulate the ability of *in-situ* bacteria to decontaminate land.

University researchers have received a £150 000 grant from environment charity Northumbrian Water Environmental Trust (NWET) for a three-year study, which will investigate how bacteria and microorganisms can be used to reclaim land contaminated by industrial processes.

The university's Microbiology and Molecular Biology research group hope the work will find a more efficient and cost effective way to salvage brownfield sites, so they can be used for leisure, business and housing. At present, large areas of land in the north of England are lying unused because of contamination left behind from industrial processes such as coal mining, steel works and gas plants. Residues including nitriles and metal cyanides are highly toxic and have to be removed before redevelopment can begin.

Traditionally contamination was removed by physical methods such as soil washing or burying the pollution. Scientists believe that bacteria found in-situ can degrade the pollutants. However, under normal conditions they are unable to remove the pollution because they need the presence of organic matter such as vegetation to function. The researchers are investigating how the organisms can be optimised to make them more active, and thereby speed up the decontamination process. Work will be based primarily in the laboratory, with small-scale experiments carried out on-site.

Detoxifying mine water

Ion Resolutions, USA, a small, privately funded company has successfully converted water from a Montana mine that was contaminated with heavy metals into drinking water.

The process, known as Donegan Process, primarily uses basic inorganic chemistry and involves various steps including mixing, filtration and other proprietary processes. The company plans to patent the process soon. To illustrate the successful treatment of the mine water to potable water standards fish have thrived in the treated water.

In addition to producing potable water, the process also results in acceptable sludge levels, as well as being able to extract the marketable copper from the mix. The company says it can treat the water at a cost of US$1.70/1000 gallons. The process is not an academic study and is now ready to be tested in the field. It can be scaled up using standard mining equipment, with no need for an expensive treatment facility.

Patent Summaries

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