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USE OF DIATOMACEOUS EARTH (DE) WASTES FOR NANO-POROUS COMPOSITE MEMBRANES IN WATER PURIFICATION SYSTEMS

The outbreaks of water-borne diseases are a common occurrence in developing countries and has claimed millions of lives in the recent years despite the many water purification approaches in use. This is because most of these water purification systems are inefficient in removal of all pathogens especially viruses from drinking water. Furthermore, the diatomaceous earth (DE) wastes have not found direct application in science. Thus, the wastes pose a challenge to DE industries. In this work, the nano-materials of diatomaceous earth wastes and activate carbon are employed in the design of efficient and effective water filtration membranes capable of eliminating pathogens and viruses from water. The DE waste and activated carbon raw materials were ground to the range of 86.0 nm to 200.0 nm. The DE wastes were characterized in terms of chemical analysis. They were found to contain 89% silica and a total flux content of 11.0% (4.14% of Al2O3, 3.88 of CaO, 0.85% of K2O, 0.19% of MgO and 5.10% of Na2O) making it a suitable material for water filter membranes. The samples for the filter membranes were fabricated from a mixture of DE and activated carbon in various ratios and fired at 900 oC. The pore size of the finished filter was in the range of 22.0 nm –150 nm. The mechanical strength of the filter membranes was enhanced by use of plant derived binders ("Mrenda") thereby increasing the filter flow rate without compromising on its structural reliability.

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