

## **High-performance cellulose acetate/polysulfone blend ultrafiltration membranes for removal of heavy metals from water**

### **ABSTRACT**

Neat cellulose acetate (CA) and CA/polysulfone (PSf) blend ultrafiltration membranes in the presence of polyvinylpyrrolidone as a pore former were prepared via a phase inversion technique. The prepared membranes were characterized by Fourier transform infrared, scanning electron microscopy, mechanical strength, water content, porosity, permeate flux and heavy metals ( $\text{Pb}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Ni}^{2+}$ ) rejection to comprehend the impact of polymer blend composition and additive on the properties of the modified membranes. The water flux expanded by increasing of PSf content in the polymer composition. CA/PSf (60/40) had the highest flux among prepared membranes. Prepared blend membranes were able to remove heavy metals from water in the following order:  $\text{Pb}^{2+} > \text{Cd}^{2+} > \text{Zn}^{2+} > \text{Ni}^{2+}$ . The CA/PSf (80/20) blend membrane had great performance among prepared membranes due to the high heavy metals removal and permeate flux.

**Keyword:** Blend membrane; Cellulose acetate; Metal ions; Polysulfone; Ultrafiltration