Research group Membrane Materials and Processes

TU/e Technische Universiteit Eindhoven University of Technology

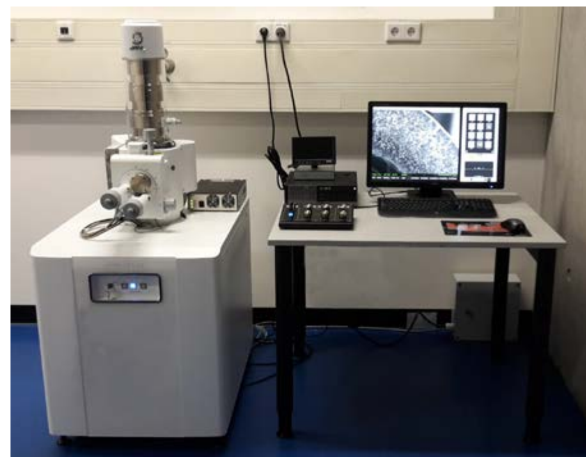
Scanning Electron Microscope

JEOL, SEM IT-100

www.tue.nl/mmp

Introduction

Scanning Electron Microscopy (SEM) is a visualizing technique that makes use of a focused electron beam to study the morphology of samples. In light microscopy the wavelength of light is the limiting factor in the resolution. Electrons have a much shorter wavelength and therefore a higher resolution, depth of field, magnification and a bigger focus area than in light microscope can be obtained.



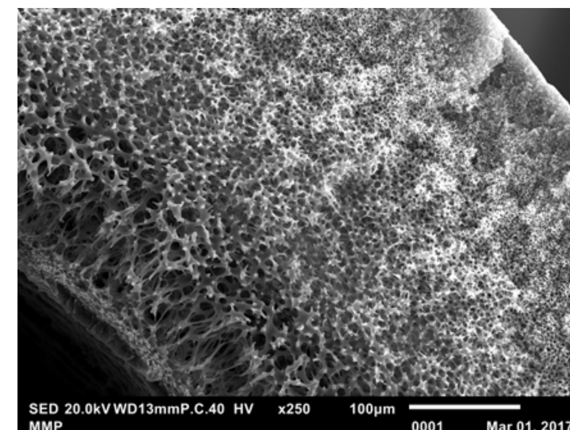
Principle

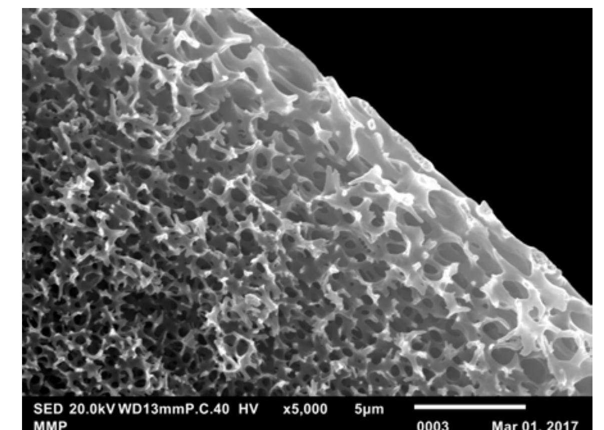
The beam of electrons is produced by the tungsten filament at the top of the SEM, after which the beam is focused vertically by electromagnetic lenses and objectives, while kept in vacuum. The electrons interact with the sample surface, ejecting different electrons and X-rays from the sample. These signals are collected by the different detectors in the SEM and are converted into the image shown on the screen.

Applications

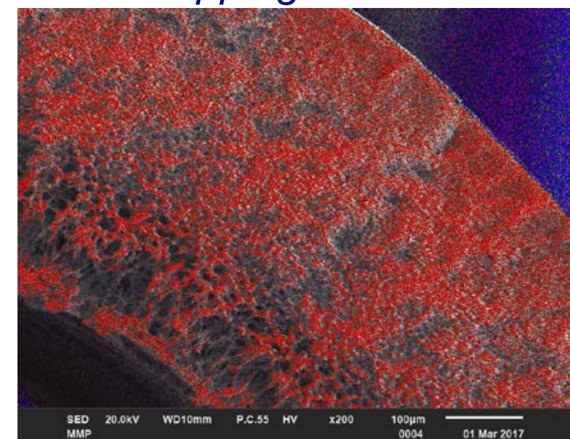
- Visualization of surfaces and cross sections of membranes
- Determination of fiber and pore sizes
- Elemental analysis of membrane surfaces in modification or fouling research.

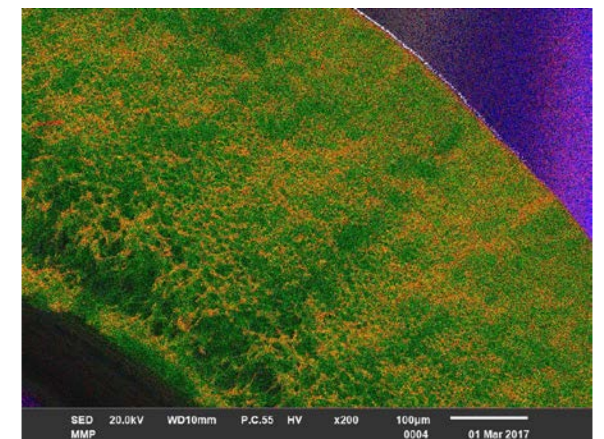
PES cross section at 20Kv, magnification 250x and 5000x





EDS mapping of the membrane cross section.





Cupper *Oxygen* *Sulphate*