

# Neha Verma

PhD Researcher



MSc Material Chemistry, University of Eastern Finland (2011)

Phone: +31 (0) 659018021

E-mail: [n.verma@tudelft.nl](mailto:n.verma@tudelft.nl)

[chem.neha@gmail.com](mailto:chem.neha@gmail.com)

Web: <http://tinyurl.com/cfofu6v>

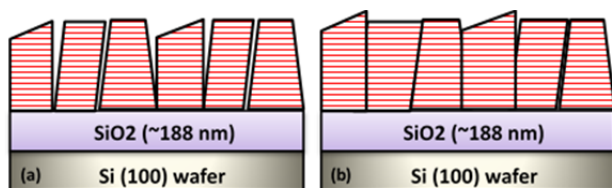
## Research interests

Thin film deposition, phase transformations, X-ray diffraction, microstructural analysis, material characterization, gas-metal interaction, metal-polymer interface, experimental design.

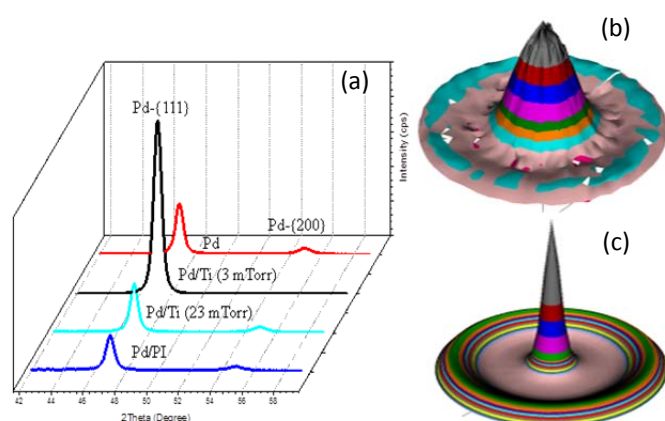
## Development of Membrane Materials for H<sub>2</sub> Gas Separation

### Research activities

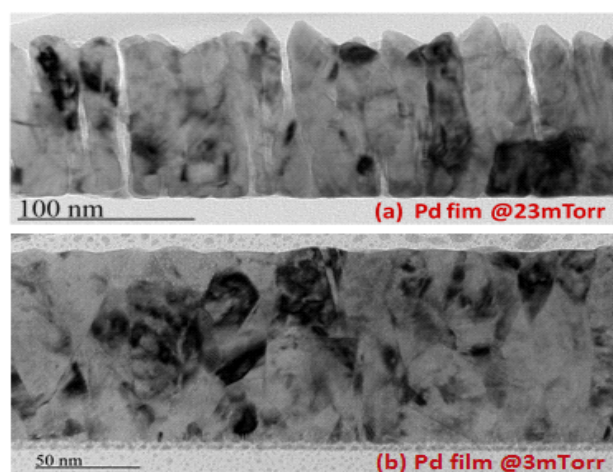
- Development of Palladium (Pd)-based thin films for membrane reactors using **sputter deposition** technique.
- Addressing structural properties of processed Pd thin films by **x-ray diffraction (XRD)** techniques.
- Designing high-temperature in-situ XRD measurements (phase transformations and stress analysis).
- Mechanical and thermal stability of ultra-thin Pd films.
- Deformations in thin films: XRD line width, particle size, dislocations, stress and texture analysis.



**Figure 1.** Schematic representation of as-deposited ~100 nm Pd thin film on oxidized Si wafer sputtered at (a) @23 mTorr (voids) and (b) @3mTorr (without voids).



**Figure 2.** (a) XRD scans of Pd film on various substrates, and texture strength represented as pole figures for Pd film with {111} (b) weak texture (WT) and (c) strong texture (ST).



**Figure 3.** Transmission electron microscopy (TEM) bright field images (a) @23 mTorr Pd film with open morphology (WT) and (b) @3mTorr Pd film with compact morphology (ST).

### Publication

N.Verma and A.J. Bottger, "Stress development and adhesion in hydrogenated nano-columnar Pd and Pd/Ti ultra-thin films" *Advanced Materials Research*, Vol. 996 (2014) pp 872-877.

### Certification

Health Physics expert level 5A (Registered expert on radioactive sources and ionising radiation generating apparatus).

### Teaching Assistant (2011 – 2015)

X-ray diffraction (XRD) practical course to M.Sc.-I students of MSE, 3mE, TU Delft.

### Technical skills

Well-versed in using XRD, SEM, AJA Magnetron sputter deposition system, AFM, TEM, Spectroscopic techniques (FTIR, NMR, UV).