Fabrication of Non-Biofouling Polyethylene Glycol Micro- and Nanochannels

Pilnam Kim, Hoon Eui Jeong, and Kahp Yang Suh

Assistant Professor
School of Mechanical and Aerospace Engineering
Seoul National University

http://nadeb.snu.ac.kr
sky4u@snu.ac.kr
Introduction and Background

Needs surface modification for bioassay or biosensor

Choice of Material !!

PEG (polyethylene glycol)
- Good bio-compatibility
- Non-biofouling
  (Resistance against protein and cell adsorption)
- High resolution (sub 100 nm)
- Fast & easy prototyping
- Transparency
- Hydrophilic: Pumpless
Fabrication of PEG Channels

**Protein Cell PEG**

**Substrate**

PEG + Micro/Nanofabrication (UV-assisted molding) = PEG micro/nano fluidic device

**Biomolecule patterning using PEG**

**Nano fabrication using PEG**

- Master
  - Replica molding
    - Attaching a PEG-coated glass or PET film
    - UV curing
    - UV curing & peeling off
    - PEG channel
    - Irreversible sealing by UV-crosslinking

- PEG mold
Results and discussion

- Channel fabrication

- Nano-channel

- PEG-Microfluidic device

- Non-biofouling

- Pumpless: Hydrophilic channel