

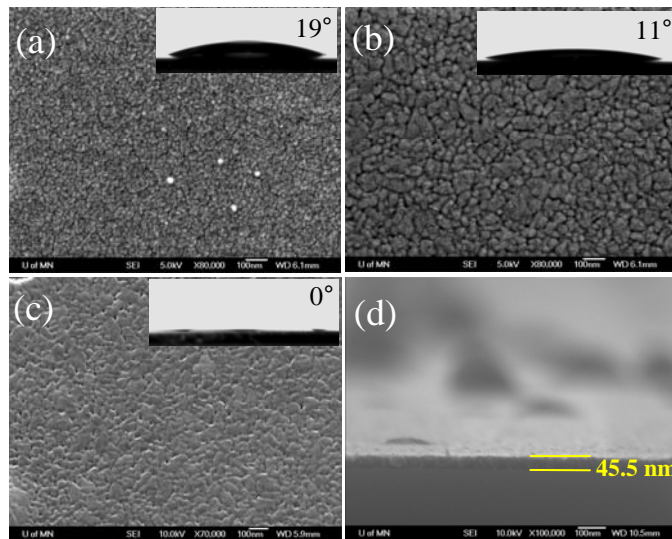
# Synthesis of Ultra-thin Superhydrophilic TiO<sub>2</sub> film

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## DESCRIPTION OF WORK

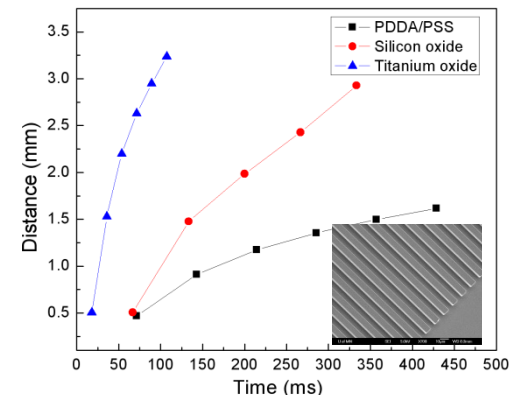
- ◆ Conventional sol-gel method is not suitable for fabricating uniform TiO<sub>2</sub> films on 3-D microstructures
- ◆ Here we synthesized ultra-thin TiO<sub>2</sub> films on silicon microchannels by an *in-situ* reaction sol-gel method



SEM images of as-synthesized TiO<sub>2</sub> film 45.5 nm thick. (a) and the film after calcination at 500 °C (b) and 700 °C (c) for 2h. (d) is the cross section of the film. Inserts are the contact angle of the corresponding film.

## MAJOR OBSERVATIONS

- ◆ TiO<sub>2</sub> films with thickness from 10 nm to 80 nm can be synthesized on silicon wafer by controlling the water concentration and reaction time
- ◆ Superhydrophilic TiO<sub>2</sub> films were obtained after calcinating at 700 °C for 2 h
- ◆ Flow velocity in the TiO<sub>2</sub> coated channels increased around ten times of that in PDDA/PSS coated channel



Flow velocity test of water in silicon microchannels with different coatings. SiO<sub>2</sub> coating was fabricated by immersing the silicon channels in boiling piranha solution for 30 min.

## Publications

- ◆ Min Zhang, Bo Zhang, Tianhong Cui, Synthesis of ultra-thin superhydrophilic titanium oxide film and its effects on the capillary of microchannels. IMECE2010, November 12-18, 2010, Vancouver, Canada