## Supplementary Information

## Free Standing TiO<sub>2</sub> Nanotube Array Electrodes with Ultra-Thin

## Al<sub>2</sub>O<sub>3</sub> Barrier Layer and TiCl<sub>4</sub> Surface Modification for High Efficiency Dye Sensitized Solar Cells

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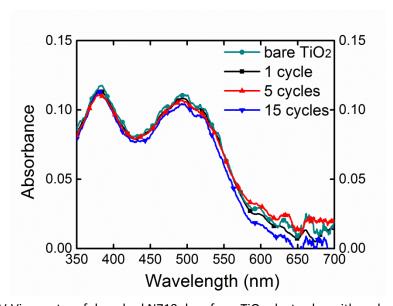


Figure S1 UV-Vis spectra of desorbed N719 dyes from  $TiO_2$  electrodes with and without  $Al_2O_3$  barrier layer.