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# Fabrication of SAMs/TiO<sub>2</sub> Hybrid Thin Films by Using Molecular Layer Deposition as the New Method

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SAMs/TiO<sub>2</sub> multilayers were fabricated by a new growth technique that can control thickness with nanometer level. This method is based on molecular layer deposition of self-assembled monolayers (SAMs) in gas phase. The dodecyltrichlorosilane(DTS)-based SAMs were formed on TiO<sub>2</sub> by molecular layer deposition at 473K under vacuum. The TiO<sub>2</sub> thin films were grown on the SAMs by atomic layer deposition from titanium isopropoxide and water at 473K. The terminal-alkyl groups of the DTS-based SAMs on TiO<sub>2</sub> were activated by using UV/O<sub>3</sub> treatment under vacuum. It was found that the alkyl groups of the DTS-based SAMs on TiO<sub>2</sub> were converted to hydrophilic groups (e.g., OH, aldehydes, carboxylic acid) during the UV/O<sub>3</sub> treatment. These results demonstrate that the hybrid multilayers can be formed by repeated SAMs/TiO<sub>2</sub> deposition under vacuum. The SAMs/TiO<sub>2</sub> multilayers exhibit a good thermal and mechanical stability, and a reversible hysteretic behavior which will be a potential material for nonvolatile memory application.