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Electrical properties of Si nanocrystals capped with SiO₂/Si₃N₄ for non-volatile memory JUNG-MIN KIM, Department of Electrical Engineering, Myongji University, E. K. LEE, Department of Physics, Myongji University, Y. KHANG, Devices Lab, Samsung Advanced Institute of Technology, EUN-HYE LEE, Devices Lab, Samsung Advanced Institute of Technology, KYO-YEOL LEE, Devices Lab, Samsung Advanced Institute of Technology, JOO-HYUN LEE, Devices Lab, Samsung Advanced Institute of Technology, C. J. KANG, Department of Physics, Myongji University, YONG-SANG KIM, Department of Electrical Engineering, Myongji University — Electrical properties of Si nanocrystals (NCs) were analyzed with respect to the shell formation of NCs. The Si nanocrystal samples produced by pyrolysis and laser ablation methods were followed by sharpening oxidation steps. In these steps Si NCs are capped with a thin oxide or nitride layer of 1-2nm thickness for isolation and the size control. It also affects the interface states of NCs, resulting in the change of electrical properties. To clarify this effect, conventional C-V, I-V and charge retention time measurements were performed on a MOS capacitor structure. Using scanning probe microscopy (SPM), we observed local properties of a capped Si nanocrystal. These results were analyzed for the size, density and shell materials of NCs. We also measured the temperature dependence of electrical properties of Si NCs.

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