

SiGe nanocrystals embedded in SiO₂ for charge storage applications

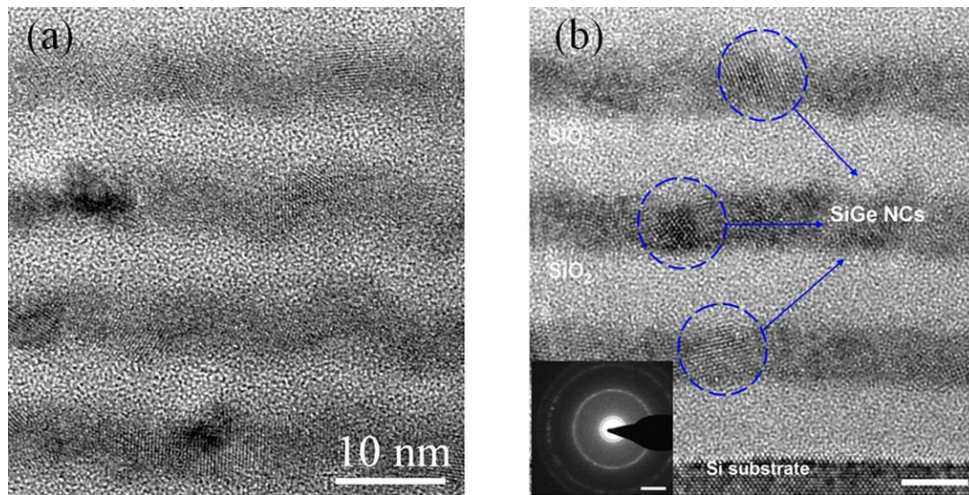
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Nanocrystals (NCs) based memories have emerged as a very promising alternative to the continuous floating gate. Each NC acts as a discrete charge storage node, leading to better charge retention and thus a greater reliability of the device. Tiwari and colleagues [1] proposed the first alternative memory using Si NCs as particles for charge storage. The challenge of these new technological systems is to produce regular NC's size and inter-distance.



HRTEM micrographs of SiGe NCs embedded in SiO₂ multilayer sample [2]

In this work, Si_{1-x}Ge_x NCs ($0 \leq x \leq 1$) embedded in SiO₂ or Al₂O₃ dielectric matrices were produced by RF sputtering technique. The NCs multilayer system were characterized by XRD, Raman, and HRTEM. The retention properties were explored and discussed in relation with the growth conditions.

[1] S. Tiwari et al, Appl. Phys. Lett. 68, 1377 (1996)

[2] E. Vieira et al, J. Appl. Phys. 111, 104323 (2012)