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Ge nanocrystals embedded in sapphire Q. XU, I.D. SHARP, D.O. YI, C.Y. LIAO, D.C. CHRZAN, E.E. HALLER, UC Berkeley and LBNL, Berkeley, CA 94720, J.W. BEEMAN, K.M. YU, J.W. AGER III, LBNL, Berkeley, CA 94720 — Ge nanocrystals are formed in a sapphire matrix by ion implantation followed by thermal annealing. Transmission electron microscopy (TEM) of as-grown samples reveals that the nanocrystals are faceted. Notably, the matrix remains crystalline despite the large implantation dose and corresponding damage. Embedded nanocrystals experience up to 4 GPa of compressive stress relative to bulk, as measured by Raman spectroscopy of the zone center optical phonon. In contrast, nanocrystals embedded in silica are observed to be spherical and experience considerably lower stresses. Also, *in situ* TEM reveals that nanocrystals embedded in sapphire melt very close to the bulk melting point (T_m= 936 °C) whereas those embedded in silica exhibit a significant melting point hysteresis around T_m. This work is supported in part by U.S. NSF Grant Nos. DMR-0109844 & EEC-0085569 and in part by U.S. DOE under Contract No. DE-AC03-76F00098.

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