



## Dielectric function of $\text{Si}_{1-x}\text{Ge}_x$ films grown on silicon-on-insulator substrates

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### Abstract

The dielectric functions of undoped and P-doped  $\text{Si}_{1-x}\text{Ge}_x$  (SiGe) films with a compressive strain on silicon-on-insulator (SOI) substrates are obtained by using spectroscopic ellipsometry. The respective Kato–Adachi and Tauc–Lorentz models are best fitted to the undoped and P-doped SiGe films to obtain their complex dielectric functions. The undoped SiGe films are characterized by multimodal peaks in the dielectric function, whereas the P-doped SiGe films exhibit only a broad peak. Further, the E0 and E1 critical points (CPs) of the undoped SiGe films are strongly dependent on the Ge concentration, whereas the E2 CPs are independent of concentration. The E0 and E2 CPs in the undoped SiGe films on an SOI substrate are lower than those of SiGe on a bulk-Si substrate owing to the higher strain. For P doping in SiGe, its dose causes non-monotonic variations in  $E_g$  and E0.

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