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Feasibility of Fabrication of Heteroepitaxial $\text{Ge}_x \text{Si}_{1-x}/\text{Si}(111)$ structure by Pulsed Nd: YAG Laser

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Abstract: Heteroepitaxial $\text{Ge}_x \text{Si}_{1-x}$ alloy layers have been formed by 10 ms and 300 μ s laser pulse induced mixing of pure germanium films and Si(111) substrates where Ge films of thickness (500-1250) Å are thermally evaporated onto Si(111) under vacuum pressure $\sim 10^{-5}$ Torr. The near surface of the sample then undergoes rapid melting and regrowth processes during each pulse from a free running Nd: YAG laser. The alloy layers are (4.6-6.5) μm thick and have a Ge fraction of $x = 6-8.2\%$.

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