

**Characteristics of the heteroepitaxial Si_{1-x}Ge_x films
grown by RTCVD method**

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ABSTRACT

The growth and the film characteristics of heteroepitaxial Si_{1-x}Ge_x films grown by the rapid thermal chemical vapor deposition (RTCVD) method are described. For the growth of Si_{1-x}Ge_x heteroepitaxial layers, SiH₄/GeH₄/H₂ gas mixtures are used. The growth conditions are varied to investigate their effects on the Si/Ge composition ratios, the interface abruptness, and the film growth rates and crystalline properties. The Si/Ge composition ratios are analyzed with the RBS and the SIMS techniques, and the interface abruptness are deduced from these data. The crystalline properties are analyzed from TEM pictures. The experimental data shows that the crystalline perfection is excellent at the growth temperature of as low as 650°C, and the composition ratios change linearly with SiH₄/GeH₄ gas mixing ratios in our experimental ranges. Boron doping experiments are also performed using 200 ppm B₂H₆ source gas. The doping profiles are measured with SIMS technique. The SIMS data show that the doping abruptness can be controlled within about 200 Å/decade.