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Polycrystalline Silicon Thin Films at Low Temperature using SiF_4 / SiH_4 mixture MONIRUZZAMAN SYED, Lemoyne Owen College, TAKAO INOKUMA, YOSHIHIRO KURATA, SEIICHI HASEGAWA, Kanazawa University — Polycrystalline silicon films with a strong (110) texture were prepared at 400°C by a plasma-enhanced chemical vapor deposition using different SiF_4 flow rates ([SiF_4] = 0–0.5 sccm) under a fixed SiH_4 flow rate ([SiH_4] = 1 or 0.15 sccm). The effects of the addition of SiF_4 to SiH_4 on the structural properties of the films were studied by Raman scattering, X-ray diffraction (XRD), Atomic force microscopy and stress measurements. For [SiH_4] = 1 sccm, the crystallinity and the (110) XRD grain size monotonically increased with increasing [SiF_4] and their respective maxima reach 90% and 900 Å. However, for [SiH_4] = 0.15 sccm, both the crystallinity and the grain size decreased with [SiF_4]. Mechanisms causing the change in crystallinity are discussed, and it was suggested that an improvement in the crystallinity, due to the addition of SiF_4, is likely to be caused by the effect of a change in the surface morphology of the substrates along with the effect of *in situ* chemical cleaning.

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