Plasma Enhanced Atomic Layer Deposition of Silicon Nitride Films with Inorganic Disilane Precursors

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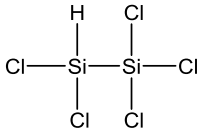
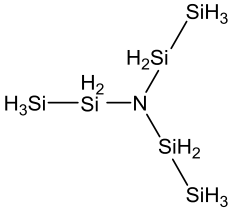
Abstract

Di or higher silanes containing one or more than one Si-Si bonds were reported to improve growth-per-cycle (GPC) rates in the atomic layer deposition (ALD) of silicon-based dielectric films. We studied this phenomenon by depositing silicon nitride (SiN) films from two inorganic disilanes without organic functionalities under different plasma enhanced ALD conditions. ALD type of film formation was observed for pentachlorodisilane (PCDS)-ammonia plasma and tris(disilanyl)amine (TDSA)-nitrogen plasma systems at 270 – 360 ^{o}C. The SiN film properties including refractive indices, compositions and wet etch rates were determined. These results will be discussed in the presentation.



PCDS



TDSA