Gas barrier properties of silicon oxide films prepared by PECVD using OMCTS (C₈H₂₄O₄Si₄) precursor and hydrogen gas

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The silicon oxide gas barrier film was deposited at low temperature by plasma-enhanced chemical vapor deposition (PECVD) using a mixture of OMCTS(C₈H₂₄O₄Si₄) precursor and hydrogen gas. We have studied reduce the carbon content of the film. CH bonding chemical structure which existed as Si-CH₃, -CHₓ in the deposited films were reduced by controlling the plasma parameters (RF bias and hydrogen gas flow rate). The chemical compositions and bonding states of the deposited films were analyzed by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Photoelectron Spectroscopy (XPS) and the gas barrier films property was characterized by water vapor transmission rate (WVTR). As a result, the better gas barrier films property could be fabricated by optimal plasma processing condition.

Keywords: Silicon oxide; PECVD; WVTR; hydrogen flow rate; RF bias