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Low temperature deposition of silicon oxide thin films by plasma enhanced CVD using Tetraethoxysilane

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In this study, the silicon oxide films have been deposited on the silicon and glass substrates by metal-organic based plasma enhanced chemical vapour deposition (PECVD) method at low temperature. The metal-organic tetraethoxy-silane (TEOS) has been used as a silicon precursor in liquid state. In addition, oxygen and argon gases have been used as oxidant and carrier gases, respectively. Effects of the $TEOS/O_2$ pressure ratio, applied RF power and the working pressure on the film properties have been studied. The chemical bonding states of the deposited films have been investigated by using furrier transform infrared spectroscopy. It has been found that the impurities contents in the silicon oxide films have been lowered by decreasing the $TEOS/O_2$ pressure ratio and increasing the applied RF power. Also some chemical structure properties of the films such as the stoichiometric coefficient and density were considered. The deposition rate and the refractive indexes of the films have been measured. The surfaces properties of the films have been investigated using atomic force microscopy and hardness micro-indentation analysis.

Keywords
Silicon oxide
Plasma
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