

Abstract Submitted  
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**Silicon Dioxide Thin Film CVD with Dichlorosilane and Carbon Dioxide**<sup>1</sup> BRANDON MCKEON, KENNETH HINTON, DAVID ALLRED, None — Silicon dioxide ( $\text{SiO}_2$ ) is useful in microelectronics and micro-fabrication (MEMS). It has traditionally been deposited through low pressure chemical vapor deposition (LPCVD) at high temperatures (about 900 to 1000 °C). One method is to take dichlorosilane (DCS) and an oxidizer such as nitrous oxide ( $\text{N}_2\text{O}$ ). Carbon dioxide ( $\text{CO}_2$ ) is isoelectric and should therefore behave similarly to  $\text{N}_2\text{O}$  in this reaction. We explored the deposition of  $\text{SiO}_2$  using  $\text{CO}_2$  and DCS via LPCVD at pressures from 600 mTorr to 5 Torr. We also followed standard practices in depositing  $\text{SiO}_2$  using nitrous oxide and DCS to be used as a standard for comparison. We used ellipsometry and energy-dispersive x-ray spectroscopy (EDS) to measure the thickness, refractive index, and chemical composition of each sample and found that all of our samples were silicon rich. We also observed that most of the deposited films were hazy.  $\text{SiO}_2$  deposited with  $\text{CO}_2$  at pressures near 600 mTorr appeared to be more attributable to thermal oxidation than deposition and was the least silicon rich and least hazy. Around 5 Torr is when  $\text{SiO}_2$  deposition with  $\text{CO}_2$  was first successful with a refractive index of 1.6, atomic ratio of Si to O of 40:60, and the most hazy.

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