Public Abstract

First Name:Yuan

Middle Name:

Last Name:Li

Adviser's First Name:C. Michael

Adviser's Last Name:Greenlief

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Surface modifications of silicon surfaces have been studied for several decades. There are several approaches for attaching organic molecules with specific functionalities to these surfaces, utilizing both the selectivity of organic molecules, and the electronic properties of silicon. In this thesis we describe two strategies for attaching a fluorophore to chemically modified Si (100) surfaces as the base of a chemical sensor. The Si surfaces are characterized using X-ray Photoelectron Spectroscopy (XPS) and these results were presented and discussed.

Ionic liquids represent a relatively new group of compounds that are thermally stable with very low vapor pressures. These unique properties enable ionic liquids to be used in a variety of applications. As the family of ionic liquids keeps growing, there is a need for vapor pressure and thermodynamic data for the vast majority of ionic liquids. In this thesis, the Knudsen effusion method is used to determine the vapor pressure of several ionic liquids in the temperature range of 380 to 420K. The relationship between the structure of ionic liquids and vapor pressure was discussed based on the vapor pressure data.