Analytical Chemistry

ABSTRACT: FUN WITH SENSORS

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This experiment was designed to determine the feasibility of an effective, inexpensive sensor, the STMicroelectronics "TouchChip", for detecting organic vapors. The basis for this project was the idea that a chip able to read and record the difference in conductivity on its surface to obtain a human fingerprint could also be used to capture the change in conductivity during the interaction of a surface coating and an analyte. The glass surface of a capacitor sensor array chip with 93184 capacitor elements 50 micrometers apart was dotted with five different polymer/carbon/tetrahydrofuran mixtures (Figure 1). After drying, the polymer-carbon samples were exposed to a range of vapors including ketone, alcohol, and aromatic gases. Exposure to these various gases yielded data on the change in conductivity within each polymer carbon matrix for each gas; the data were then combined to reveal a specific recognition pattern or 'fingerprint' for each gas (Figure 2). Data from the experiment also yielded information concerning how quickly each matrix responded to separate gases (Figure 3), as well as indicated possible future uses for the sensor model. A continuation of this research is attempting to capture changes in capacitance during an antibody/antigen interaction.

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Figure 1) Dried Polymers on the surface of Chem Array chip

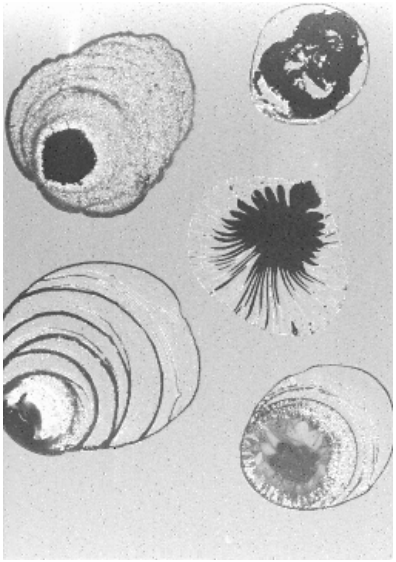
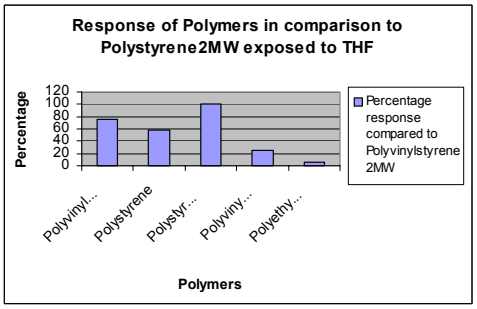
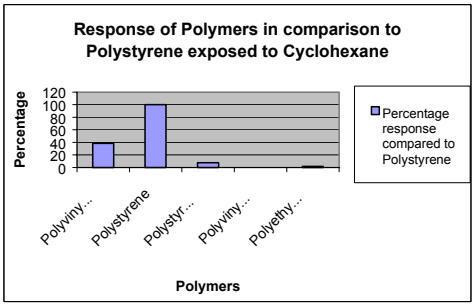


Figure 2) Fingerprints of test gases

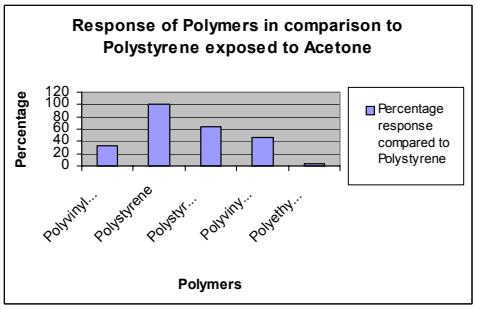
a) THF



b) Cyclohexane



c) Acetone



d) Ethanol

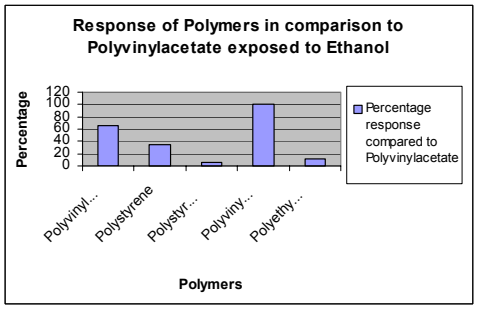
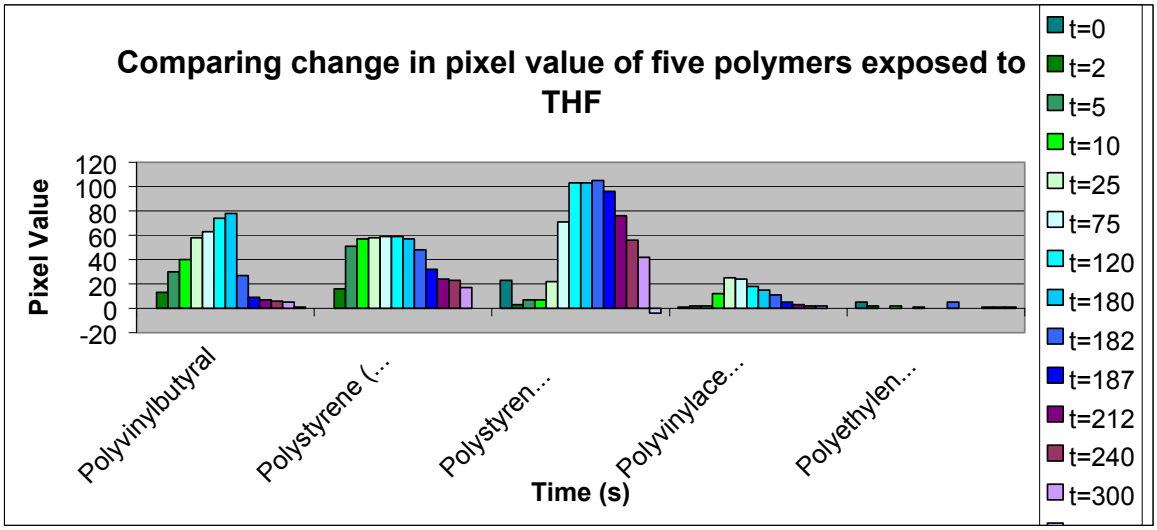



Figure 3) Kinetics of polymer activity during exposure to THF vapor