

## **CHAPTER V**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1. Conclusions**

1. Teflon test was conducted at room temperature and at an elevated temperature to confirm the permeability coefficients with the previous test results as well as the literature value. The test results of permeability coefficients for hydrogen diffusion through Teflon obtained in this study was comparable to the literature value.
2. At room temperature and at an elevated temperature, the permeability coefficients were found to increase with increasing temperature, as expected from the Arrhenius relationship.
3. The various materials were tested with a hydrogen gas mixture to determine if hydrogen passed readily using the breakthrough time (B/T). Fluorodyn Caulk and Derakane Resin are the potential materials because of the passage of hydrogen through those coating materials.

4. For Fluorodyn Caulk and Derakane Resin, the permeability coefficients were determined for a number of thicknesses. From Fluorodyn Caulk and Derakane Resin Results, this indicates an independent relationship between thickness and permeability coefficients.
5. For determining the chlorine permeability, there was no the breakthrough time (B/T) for Fluorodyn Caulk and Derakane Resin. This indicates there was some blocking chlorine diffusion through these materials. To date, Fluorodyn Caulk and Derakane Resin are thus promising candidate barriers for blocking chlorine.

## **5.2. Recommendations**

According to the test results for all possible materials, it was found out the effective promising candidates as coating materials of an instrument for measuring hydrogen concentration in the presence of moist chlorine which were Fluorodyn Caulk and Derakane Resin. The author would like to recommend testing some further possible materials for hydrogen and chlorine permeability experimental tests to find out the superior coating material. Furthermore, applying the effective coating material with an continuous instrument such as the Pd/H sensor, potentiometric sensor, amperometric sensor, etc will be tested to consider the response time when the hydrogen concentration is changed and identify the suitable instrument .