<p>| CHAPTER |
|-----------------|-----------|
| 1 | INTRODUCTION | 1 - 33 |
| 1.1 | Definition | 1 |
| 1.2 | History | 1 |
| 1.3 | Classification of ion exchangers | 3 |
| 1.4 | Background and scope of work undertaken | 31 |
| 2 | MATERIALS AND METHODS | 34 - 54 |
| 2.1 | Chemicals and water | 34 |
| 2.2 | Standard solutions and indicators | 34 |
| 2.3 | Solutions for $K_d$ value determinations | 36 |
| 2.4 | Instruments | 38 |
| 2.5 | Estimation and analysis | 41 |
| 2.6 | Characterisation of ion exchangers | 49 |
| 3 | EXPERIMENTAL PROCEDURE | 55 - 62 |
| 3.1 | Preparation and characterisation of PIA and PASI | 55 |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>Preparation and characterisation of stannic acid, stannic silicates and stannic phosphate</td>
<td>61</td>
</tr>
<tr>
<td>3.3</td>
<td>Preparation and characterisation of titanic acid and titanic silicates</td>
<td>64</td>
</tr>
<tr>
<td>3.4</td>
<td>Preparation and characterisation of ferrosilicates and and alumino silicates</td>
<td>66</td>
</tr>
<tr>
<td>3.5</td>
<td>Ion-exchange in nonaqueous and aqueousorganic media</td>
<td>68</td>
</tr>
</tbody>
</table>

4 RESULTS AND DISCUSSION 70 - 132

4.1 Polyantimonic acid and antimonosilicates 70
4.2 Stannic acid, stannic silicates and stannic phosphate 90
4.3 Titanium oxide and silicates 103
4.4 Comparison of different exchangers 113
4.5 Iron and aluminium silicates 116
4.6 Ion-exchange in nonaqueous and aqueousorganic solvents 121

5 SUMMARY 133 - 141

REFERENCES 142 - 166