<table>
<thead>
<tr>
<th>Fig.</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Solidification structure of hypoeutectic Al-Si alloy</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>The phase diagram of Al-Si</td>
<td>10</td>
</tr>
<tr>
<td>2.3</td>
<td>Schematic diagram of Stir casting technique</td>
<td>13</td>
</tr>
<tr>
<td>3.1</td>
<td>Experimental setup – Melting furnace</td>
<td>34</td>
</tr>
<tr>
<td>3.2</td>
<td>Metal mould used for casting</td>
<td>35</td>
</tr>
<tr>
<td>3.3</td>
<td>Mould cavity</td>
<td>35</td>
</tr>
<tr>
<td>3.4</td>
<td>Tensile test specimen</td>
<td>37</td>
</tr>
<tr>
<td>3.5</td>
<td>Photographic image of the specimen</td>
<td>38</td>
</tr>
<tr>
<td>3.6</td>
<td>Universal testing machine</td>
<td>38</td>
</tr>
<tr>
<td>3.7</td>
<td>Pin on disk wear testing machine</td>
<td>39</td>
</tr>
<tr>
<td>4.1</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si alloy</td>
<td>42</td>
</tr>
<tr>
<td>4.2</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si-2Ni alloy</td>
<td>42</td>
</tr>
<tr>
<td>4.3</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si-4Ni alloy</td>
<td>43</td>
</tr>
<tr>
<td>4.4</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si-6Ni alloy</td>
<td>43</td>
</tr>
<tr>
<td>4.5</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si-8Ni alloy</td>
<td>44</td>
</tr>
<tr>
<td>4.6</td>
<td>Microstructure of as-cast Al-0.4Mg-8Si-10 Ni alloy</td>
<td>44</td>
</tr>
<tr>
<td>4.7</td>
<td>SEM image of Al-0.4Mg-8Si alloy</td>
<td>45</td>
</tr>
<tr>
<td>4.8</td>
<td>EDS result of Al-0.4Mg-8Si alloy</td>
<td>45</td>
</tr>
<tr>
<td>4.9</td>
<td>SEM image of Al-0.4Mg-8Si-2Ni alloy</td>
<td>46</td>
</tr>
<tr>
<td>4.10</td>
<td>EDS result of Al-0.4Mg-8Si-2Ni alloy</td>
<td>47</td>
</tr>
<tr>
<td>4.11</td>
<td>SEM image of Al-0.4Mg-8Si-4Ni alloy</td>
<td>47</td>
</tr>
<tr>
<td>4.12</td>
<td>EDS result of Al-0.4Mg-8Si-4Ni alloy</td>
<td>48</td>
</tr>
<tr>
<td>4.13</td>
<td>SEM image of Al-0.4Mg-8Si-6Ni alloy</td>
<td>48</td>
</tr>
<tr>
<td>4.14</td>
<td>EDS result of Al-0.4Mg-8Si-6Ni alloy</td>
<td>49</td>
</tr>
<tr>
<td>4.15</td>
<td>SEM image of Al-0.4Mg-8Si-8Ni alloy</td>
<td>49</td>
</tr>
<tr>
<td>4.16</td>
<td>EDS result of Al-0.4Mg-8Si-8Ni alloy</td>
<td>50</td>
</tr>
<tr>
<td>4.17</td>
<td>SEM image of Al-0.4Mg-8Si-10Ni alloy</td>
<td>50</td>
</tr>
<tr>
<td>4.18</td>
<td>EDS result of Al-0.4Mg-8Si-10Ni alloy</td>
<td>51</td>
</tr>
<tr>
<td>4.19</td>
<td>XRD result of Al-8Si-0.4Mg alloy</td>
<td>51</td>
</tr>
</tbody>
</table>
Fig. 4.20 XRD result of Al-8Si-0.4Mg-2Ni alloy
Fig. 4.21 XRD result of Al-8Si-0.4Mg-4Ni alloy
Fig. 4.22 XRD result of Al-8Si-0.4Mg-6Ni alloy
Fig. 4.23 XRD result of Al-8Si-0.4Mg-8Ni alloy
Fig. 4.24 XRD result of Al-8Si-0.4Mg-10Ni alloy
Fig. 4.25 TEM image of Al-8Si-0.4Mg-2Ni alloy
Fig. 4.26 SAED pattern of Al-8Si-0.4Mg-2Ni alloy
Fig. 4.27 TEM image of Al-8Si-0.4Mg-4Ni alloy
Fig. 4.28 SAED pattern of Al-8Si-0.4Mg-4Ni alloy
Fig. 4.29 TEM image of Al-8Si-0.4Mg-6Ni alloy
Fig. 4.30 SAED pattern of Al-8Si-0.4Mg-6Ni alloy
Fig. 4.31 TEM image of Al-8Si-0.4Mg-8Ni alloy
Fig. 4.32 SAED pattern of Al-8Si-0.4Mg-8Ni alloy
Fig. 4.33 TEM image of Al-8Si-0.4Mg-10Ni alloy
Fig. 4.34 SAED pattern of Al-8Si-0.4Mg-10Ni alloy
Fig. 4.35 Hardness vs wt% Ni
Fig. 4.36 %Increment in hardness vs. wt% Ni
Fig. 5.1 Ultimate tensile strength vs. wt% Ni
Fig. 5.2 Yield strength vs. wt% Ni
Fig. 5.3 YS vs. Hardness
Fig. 6.1 Wear vs. Time plot for Al-0.4Mg-8Si alloy
Fig. 6.2 Wear vs. Time plot for Al-0.4Mg-8Si -2Ni alloy
Fig. 6.3 Wear vs. Time plot for Al-0.4Mg-8Si-4Ni alloy
Fig. 6.4 Wear vs. Time plot for Al-0.4Mg-8Si -6Ni alloy
Fig. 6.5 Wear rate vs. wt% Ni
Fig. 6.6 Wear rate vs. hardness
Fig. 6.7 %Reduction in wear rate vs. wt% Ni
Fig. 6.8 CoF vs. Time plot for Al-0.4Mg-8Si alloy
Fig. 6.9 CoF vs. Time plot for Al-0.4Mg-8Si-2Ni alloy
Fig. 6.10 CoF vs. Time plot for Al-0.4Mg-8Si-4Ni alloy
Fig. 6.11 CoF vs wt% Ni
Fig. 6.12 CoF vs. Hardness
Fig. 7.1 UTS vs wt% Ni for various test temperatures
Fig. 7.2 YS vs wt% Ni for various test temperatures
Fig. 7.3 %El vs wt% Ni for various test temperatures
Fig. 7.4 UTS vs Temperature plot for Al-Mg-Si-xNi (x=0, 2, 4, 6, 8 and 10) alloys
Fig. 7.5 YS vs Temperature plot for Al-Mg-Si-xNi (x=0, 2, 4, 6, 8 and 10) alloys
Fig. 7.6 %El vs Temperature plot for Al-Mg-Si-xNi (x=0, 2, 4, 6, 8 and 10) alloys
Fig. 7.7 Comparison of UTS data
Fig. 8.1 Microstructure of as-cast Al-0.4Mg-2Ni-4Si alloy
Fig. 8.2 Microstructure of as-cast Al-0.4Mg-2Ni-8Si alloy
Fig. 8.3 Microstructure of as-cast Al-0.4Mg-2Ni-12Si alloy
Fig. 8.4 Microstructure of as-cast Al-0.4Mg-2Ni-16Si alloy
Fig. 8.5 SEM image of Al-0.4Mg-2Ni-4Si alloy
Fig. 8.6 EDS result of Al-0.4Mg-2Ni-4Si alloy
Fig. 8.7 SEM image of Al-0.4Mg-2Ni-8Si alloy
Fig. 8.8 EDS result of Al-0.4Mg-2Ni-8Si alloy
Fig. 8.9 SEM image of Al-0.4Mg-2Ni-12Si alloy
Fig. 8.10 EDS result of Al-0.4Mg-2Ni-12Si alloy
Fig. 8.11 SEM image of Al-0.4Mg-2Ni-16Si alloy
Fig. 8.12 EDS result of Al-0.4Mg-2Ni-16Si alloy
Fig. 8.13 XRD result of Al-0.4Mg-2Ni-4Si alloy
Fig. 8.14 XRD result of Al-0.4Mg-2Ni-8Si alloy
Fig. 8.15 XRD result of Al-0.4Mg-2Ni-12Si alloy
Fig. 8.16 XRD result of Al-0.4Mg-2Ni-16Si alloy
Fig. 8.17 TEM image of Al-0.4Mg-2Ni-4Si alloy
Fig. 8.18 SAED pattern of Al-0.4Mg-2Ni-4Si alloy
Fig. 8.19 TEM image of Al-0.4Mg-2Ni-8Si alloy
Fig. 8.20 SAED pattern of Al-0.4Mg-2Ni-8Si alloy
Fig. 8.21 TEM image of Al-0.4Mg-2Ni-12Si alloy  
Page No. 95
Fig. 8.22 SAED pattern of Al-0.4Mg-2Ni-12Si alloy  
Page No. 95
Fig. 8.23 TEM image of Al-0.4Mg-2Ni-16Si alloy  
Page No. 96
Fig. 8.24 SAED pattern of Al-0.4Mg-2Ni-16Si alloy  
Page No. 96
Fig. 8.25 Hardness vs wt% Si  
Page No. 97
Fig. 8.26 Ultimate tensile strength vs. wt% Si  
Page No. 99
Fig. 8.27 Yield strength vs. wt% Si  
Page No. 100
Fig. 8.28 Yield strength vs. hardness  
Page No. 100
Fig. 9.1 Wear vs. Time plot for Al-0.4Mg-2Ni-4Si alloy  
Page No. 102
Fig. 9.2 Wear vs. Time plot for Al-0.4Mg-2Ni-8Si alloy  
Page No. 103
Fig. 9.3 Wear rate vs. wt% Si  
Page No. 104
Fig. 9.4 Wear rate vs. hardness  
Page No. 104
Fig. 9.5 CoF vs. Time plot for Al-0.4Mg-2Ni-4Si alloy  
Page No. 106
Fig. 9.6 CoF vs. Time plot for Al-0.4Mg-2Ni-8Si alloy  
Page No. 107
Fig. 9.7 CoF vs. wt% Si  
Page No. 107
Fig. 9.8 CoF vs. Hardness  
Page No. 108