CHAPTER 4

INFLUENCE OF PROCESSING PARAMETERS ON PROPERTIES OF PARTICULATE REINFORCED METAL MATRIX COMPOSITE

4.1 RESULTS AND DISCUSSION

This chapter discusses the influence of the processing parameters during stir casting on the distribution of the SiC particles in an Al matrix, and the resultant mechanical properties of PRMMCs, Al-11.12 Si / 10% SiCp composites that were fabricated at different processing conditions. To study the particle distribution, a microstructure analysis, hardness distribution and density distribution were carried out. The tensile test was conducted at room temperature on the PRMMCs by using the FIE tensile test machine. The charpy test was conducted on the specimen to study of the influence the processing parameters on impact energy.

4.2 Effect of Processing Temperatures on the Processing of Al-SiCp Composites

The processing temperature influences the viscosity of the Al matrix. The viscosity changes of the molten metal with respect to the temperature are a contributory problem in the liquid state of processing. The change of viscosity of the Al/SiCp was calculated numerically by using Arrhenius equation (Fabio Miani and Paolo Matteazzi 1992; Battezzati and Greer 1989).

$$\eta = \eta_0 \exp\left(\frac{E}{RT}\right)$$  \hspace{1cm} (3.1)
where \( \eta_0 \) - Viscosity of aluminium at the melting temperature

E - Activation energy for the viscous flow of aluminium

R - Universal gas constant

T - Processing temperature

The viscosity of the liquid Al matrix with 10% SiCp is often calculated with the Einstein function as follows (Jun Wang et al 2003):

\[
\eta/ \eta_0 = 1 + 2.5C + 10.5C^2 + \exp(A \cdot B),
\]

in which \( A = 0.0023 \), \( B = 16.6 \), \( C \) is the volume fraction of particles. The changes in viscosity with respect to various processing temperatures are shown in Figure 4.1.

![Figure 4.1 Changes in viscosity as a function of temperature](image)

The change in viscosity is significant, as can be seen by comparing the Al alloy and Al/SiCp composites. The suspending liquid apparent viscosity of Al/SiCp is higher by nearly 38% than that of the Al matrix without reinforcement. But, both viscosities generally decreased when the processing temperature was increased from 700°C to 900°C. The change in viscosity influences the particle distribution in the Al matrix. At higher viscosity and lower temperature (<750°C), the contact of particles is restricted
by the vortex of the molten metal. Therefore, the particles are distributed non-uniformly in this range. The clustering of particles was broken by the vortex of the molten metal when the liquid was stirred for a prolonged even at lower temperature. But, at lower viscosity and higher temperature (above 800°C), the contact of particles is not captured, and it was not possible to restrict their movement in the vortex of the molten metal under constant stirring speed. Hence, the particles would be distributed uniformly by increasing temperature from 750°C to 850°C. The particles settled down at higher temperature (>850°C) due to the viscosity of the molten metal being low compared to other temperatures.

4.3 Effect of Processing Temperatures and Holding Times on the Microstructure of the Al/SiCp Composites

The uniform distribution of particles in the matrix is essential to obtain the desired mechanical properties. However, sometimes particle clustering or agglomerations are formed in the matrix. This agglomeration specifically decreases the mechanical properties of the PRMMCs. Although it is very critical to have the desired properties, the possible causes of particle clustering or agglomeration have not been investigated thoroughly. Hence, the purpose of this study is to investigate experimentally the SiC particle distribution in the Al matrix material, and the reasons leading to particle clustering in the PRMMCs. The distribution of the SiC particles within the Al Matrix material can be controlled to some extent during processing. Parameters such as the processing temperature and holding time control the particle distribution in the matrix. In this present study, the processing temperatures have been taken as 700°C, 750°C, 800°C, 850°C, and 900°C. The holding times have been taken as 10, 20 and 30 Min.
Samples for microstructure analysis were taken at bottom, middle, and top from the casting specimens. The metallographic specimens were polished and viewed through an optical microscope to reveal the particle distribution. Figures 4.2, 4.3, 4.4, 4.5 and 4.6 show the optical microscope showing the distribution of the SiC particles and the microstructure of the processed composites. From an examination of the microstructures, it can be seen that the effect of the processing temperature and holding time on the distribution of particles was considerable.

By increasing the holding time from 10 minutes to 30 minutes at 700°C temperature, more agglomerations were found in the microstructure, because the viscosity of the Al melt is high. At lower temperatures for shorter periods of time, the movement of particles in the liquid was restricted. But, for 30 minutes holding time the particles were distributed uniformly in the matrix. It has been identified from Figure 4.2 that a greater concentration of agglomeration sites was found in the specimen at 700°C temperature. Similar results were observed at 750°C processing temperature, but there is a relaxation in the degree of clustering, due to the change in the viscosity as shown in Figure 4.3.
Figure 4.2  Particle distributions of Al/SiCp composites at 700°C with different holding time of (a) 10 Min. (b) 20 Min. (c) 30 Min.
Figure 4.3  Particle distributions of Al/SiCp composites at 750°C with different holding time of (a) 10 Min. (b) 20 Min. (c) 30 Min.
Figure 4.4  Particle distributions of Al/SiCp composites at 800°C with different holding time of (a) 10 Min. (b) 20 Min. (c) 30 Min.
Figure 4.5 Particle distributions of Al/SiCp composites at 850°C with different holding time of (a) 10 Min. (b) 20 Min. (c) 30 Min.
Figure 4.6 Particle distribution of Al/SiCp composites at 900°C with different holding time of (a) 10 Min. (b) 20 Min. (c) 30 Min.
It has been identified from Figure 4.4 that the increase in holding time from 10 to 20 minutes, results in better particle distribution, which was observed in the microstructure. Further increasing the holding time to 30 minutes at 800°C resulted in better particle distribution due to the effect at lower viscosity of the liquid melt at high temperature. At this temperature, the liquid metal has sufficient viscosity (viscosity values of the liquid low compared to those at 700°C and 750°C). Therefore, the movement of the particles in the liquid metal has not been restricted, and also the clustering of the particles was broken by the vortex created by the stirring of the metal. Figure 4.5 shows the optical micrographs showing the distribution of the SiC particles in the Al matrix within the composites.

When the processing temperature is 800°C, the viscosity of the liquid melt decreases which allows the SiC particle to easily disperse inside the liquid melt. The tendency of formation of particle clusters is minimized due to the sufficient viscosity at 800°C. The sufficient viscosity helps to enhance the stability of the slurry by reducing the settling velocity.

It has been identified from the Figure 4.5 that clusters of particles in some localized regions were formed in the specimen processed at 850°C temperature with holding times of 10 Min. to 30 Min. But the inter particle distance is increased while increasing the holding time, due to the low viscosity of liquid metal. Thus, it is not effective under 850°C processing temperature. But, in the case of 900°C temperature, the particles cluster identified in Figure 4.6. At this high temperature, the viscosity of the liquid metal is very low compared to that at other temperatures, and also the particles easily settled down in the cast specimens. SiC particles were not indentified in some regions of the matrix. The homogeneous particle distribution has been achieved by the holding time of 20 Min. It is also understood from the microstructure that increasing the processing temperature
will not distribute the particles, and that the holding time is another deciding factor.

It can be seen from Figure 4.6 that the particles cluster corresponding to an increase in the holding time of 30 minutes with respect to 900°C processing temperature. The viscosity of the molten liquid is low compared to that at other temperatures. Nearly 24% of the viscosity was reduced when compared to that at 700°C. Therefore, the particles may be unevenly distributed macroscopically (particles settling) and microscopically (particles cluster). It was observed that the tendency towards the formation of the particle cluster was greater at higher holding time than at a lower holding time. During the higher holding time with temperature, the geometry of the capturing of the particles does not restrict their movement inside the liquid metal as well as during solidification. Also the presence of the low viscosity of the liquid metal tends to physically not restrict growth of the porosity. Thus, the tendency to cluster is high at higher temperatures with prolonged contact between the matrix and the reinforcement.

Particle settling is another important factor in the formation of particle clustering due to the gravity in the cast specimens. The particle setting in the cast depends on the viscosity of the molten melt and holding time. At higher processing temperature (>850°C) with a prolonged contact time (30 minutes), the particles are easily settled. Hence, the settling of the SiC particles was because of the non-uniform distribution of the reinforcement in the matrix, which in turn, has significant consequences on the final microstructure.

The stirring action is also considered as an important factor in the formation of particle cluster and porosity in the aluminium matrix (Hashim et al 2002). By increasing the processing temperature to 800°C at a constant stirring speed and prolonged contact time, the vortex flow of the liquid can
suck the air bubbles into the melts. Particles often attached themselves to the air gas bubbles, which formed the particle clustering or porosity in the Al matrix. It is shown in Figure 4.5. Sometimes, the particles agglomerated in the matrix by the solidification process. During the growth of dendrites, the distribution of the SiC particles in the melt could be agglomerated either by the dendrite front or pushed ahead by the front as shown in Figure 4.7, depending on the velocity of the growing front and geometrical compatibility between the dendrite arm spacing (DAS) and particle sizes. This phenomenon leads to particle clustering in the matrix even in a homogenous state during the solidification process. Hence, the solidification rate also influences the particle distribution in the matrix. Similar results were observed for the remaining parameters in composites which were processed at different processing temperatures with holding times of 20 to 30 minutes.

Figure 4.7 SiCp distributed in the boundary region of the Al matrix

4.4 Effect of Holding Time on the Processing of Al/SiCp

Holding time helps during the processing of Al/SiCp composites mainly in two ways: (i) to distribute the particles in the liquid, and (ii) to create perfect interface bond between the reinforcement and the matrix. The holding time between the matrix and the reinforcement is considered as an
important factor in the processing of composites. When the holding time is 10 minutes, the particles are not distributed uniformly in the matrix at 700°C, 750°C and 800°C. The liquid matrix has high viscosity in the temperature range, and the velocity of particle flow is low. Therefore, the movement of the particles was restricted in the liquid metal during the short period. Hence, the particles were not distributed during 10 minutes holding time. In 20 minutes holding time, the liquid metal has sufficient viscosity. Therefore, the movements of the particles are not restricted in the liquid. Thus, the particles are distributed uniformly in this condition. But, above 800°C temperature, the particles are randomly distributed in liquid due to the further decrease in viscosity of the molten metal (as can be seen in Figure 4.7). In the case of 30 minutes holding time, the liquid has high viscosity at a lower temperature (<850°C) but the contact time between matrix and reinforcement was too large, which breaks the agglomeration during this period, and the particles are distributed uniformly in liquid even though some of the particles form agglomeration. A vortex created during the stirring can suck the air bubbles into the liquid metal. As the result, the particles were attached to the air bubbles to form the particles cluster in the matrix. At a higher temperature, with prolonged contact time (>800°C), more particle clusters are found in the composite as shown Figure 4.5.

During the processing of Al/SiCp composites, there is a likelihood of the formation of deleterious reaction products like Al₄C₃ as well as the dissolution of the SiC into the molten Al alloy. At higher melt temperatures of the Al melt with prolonged contact time, it was proven that the solid SiC was segregated into Si and C (Romero and Arsenault 1995; Shubin et al 2008). The reaction takes place as follows: SiC→Si+C. When the holding time and temperature increased, the segregation level of the SiC into Si and C also increased. The segregated Si was eventually driven in the opposite direction, and slowly dissolved in the liquid Al, while the carbon elements were left at
the interface. The dissolution of the Si in the liquid Al was faster compared to that of carbon.

Based on the EDS analysis, the concentration of the Si was found to be high near the interface region. The solubility of the C elements in the liquid Al was very low at eutectic temperature, thus the formation of Al₄C₃ was low. The concentration of the Si near the interface matrix region may reduce the formation of Al₄C₃. The concentration of Si at the interface region is shown in Figure 5.6. The Si concentration at the interface increases when the holding time and processing temperature are increased.

4.5 Density distribution in cast specimen

Density distribution is associated with the distribution of the particles in the cast MMC. Density measurements were carried out using the Archimedes principle. Density measurements were carried out using an electronic balance with double distilled water as the liquid medium. Masses of the specimens were recorded to an accuracy of 0.1 mg, at room temperature, and subsequent calculations were performed to obtain the apparent density and bulk density (Santhosh et al 2008). At least 10 specimens of the MMCs for each processing condition were considered in order to obtain a truly representative for density. The density distribution is plotted in Figures 4.8, 4.9 and 4.10. High density variation was observed in the specimen fabricated at 850°C and 900°C with 10 Min., 20 Min. and 30 Min. holding time. The above and almost equal density Al alloy was observed at 700°C, 750°C, 800°C with 10, 20 and 30 minutes. The low density in the specimen reflects the non inclusion or non uniformity of the SiC particles in the matrix. The high density reflects the excess amount of the SiC particles in the matrix. The theoretical density of the composite can be accurately predicted by the simple ‘rule of mixture’. The density of the composite is given by
\[ \rho_c = \rho_m v_m + \rho_r v_r \]  

(3.2)

Where:

- \( \rho_c \) - density of the composite
- \( \rho_m \) - density of the matrix metal
- \( \rho_r \) - density of the reinforcement
- \( v_m \) - volume of the matrix
- \( v_r \) - volume of the reinforcement

Figure 4.8  Density variation observed in the cast PRMMC specimens fabricated at 10 minutes holding time
Figure 4.9  Density variation observed in the cast PRMMC specimens fabricated at 20 minutes holding time

Figure 4.10  Density variation observed in cast PRMMCs specimens fabricated at 30 minutes holding time
4.6 Effect of the Processing Parameters on the Mechanical Properties of Al-SiCp

4.6.1 Tensile properties

The property of composites depends mainly on the distribution of the particles in the matrix. It is necessary to understand the particle distribution in the matrix in order to correlate the properties of the PRMMCs. The tensile test was conducted on a flat shaped specimen, performed according to the ASTM standard (E-8 model) test methods. Figure 4.11 shows the standard dimension of the sub- size tensile specimen.

![Figure 4.11 Standard dimensions of the tensile test specimen](image)

Figure 4.11 shows the variation in the ultimate tensile strength as a function of the processing temperature as illustrated for Al-10% SiCp composites with different holding times. These composites exhibit different tensile behaviors. The ultimate tensile strength of Al/10% SiCp is higher than the unreinforced Al alloy. The distribution of SiC particles in the matrix reduces the ductility and increases the strength of composite materials. The overall strength of the composites is influenced by the distribution of the particles in the matrix. Figure 4.13, 4.14 and 4.15 shows, stress –strain curve for Al/SiCp composites materials. The ultimate strength of the Al-10% SiCp composite has increased and shows the maximum value as the processing temperature changes from 700°C to 800°C, and then it began to decrease with a further increase of the processing temperature from 800°C to 900°C. The changes of yield strength and ultimate strength are given in Table 4.1.
Ultimate stress of the A/SiCp composite is high at 20 minutes holding time compared to that of other holding times. It is shown that the SiC particles are uniformly distributed in the matrix. It is evident from the microstructure shown in Figures 4.3(b), 4.4(b), 4.5(b).

![Stress-strain curve of Al/SiCp at 10 Min. holding time with different processing temperatures](image)

**Figure 4.12** Effect of the processing parameters on the tensile strength of the Al/SiCp

**Figure 4.13** Stress-strain curve of Al/SiCp at 10 Min. holding time with different processing temperatures
Figure 4.14 Stress-strain curve of Al/SiCp at 20 Min. holding time with different processing temperatures

Figure 4.15 Stress-strain curve of Al/SiCp at 30 Min. holding time with different processing temperatures
Table 4.1 Comparison of composite strength with base alloy

<table>
<thead>
<tr>
<th>TEMPERATURE (°C)</th>
<th>10 MINUTES</th>
<th>20 MINUTES</th>
<th>30 MINUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YS (Mpa)</td>
<td>UTS (Mpa)</td>
<td>% of elong.</td>
</tr>
<tr>
<td>700</td>
<td>124</td>
<td>175.6</td>
<td>11.2</td>
</tr>
<tr>
<td>750</td>
<td>132</td>
<td>182</td>
<td>9</td>
</tr>
<tr>
<td>800</td>
<td>140</td>
<td>185</td>
<td>8.63</td>
</tr>
<tr>
<td>850</td>
<td>122</td>
<td>158</td>
<td>11.6</td>
</tr>
<tr>
<td>900</td>
<td>120</td>
<td>156</td>
<td>12</td>
</tr>
</tbody>
</table>

(YS of base alloy: 125 Mpa, UTS of base alloy: 141 Mpa, % of elongation of base alloy: 14.2)

During the tensile deformation, the presence of particles hinders the movement during the plastic deformation and it exhibits the isotropic properties in the matrix. Therefore, the ultimate strength is increased gradually. The tensile strength of the specimen processed at temperatures from 800°C to 900°C, shows the decreasing trend of the ultimate tensile strength which is due to the formation of clusters of SiCp in the matrix. The SiC particles found in this region will have the particles cluster with porosity. The porosity is formed in the liquid matrix due to the vortex created by the stirring action which entrapped the gases inside the liquid matrix. It is evident from Figures 4.4(b), 4.4(c) and 4.5 (c) that the clustering of particles is present in the microstructure which has a considerable effect on the strength and plastic behavior of the composites.

Particle clustering can initiate premature failure because of the high plastic strain that occurs in the matrix material near the particle cluster region. The ultimate strength values obtained for the specimen processed at a higher temperature was found to be low. The reason for this is that, the plastic flow of matrix around the particle-clustered region initiates crack propagation.
during the early stage of loading which resulted in lower failure strain. In the particle cluster regions, the partial wetting of the liquid metal over the SiC particle leads to lower bonding strength. So, during tensile test there is no transfer of stress from the matrix to the particle, and also at an early stage near the cluster region resulted in failure at lower strain and stress. Therefore, by increasing the process temperature from 700°C to 800°C the matrix gets optimized viscosity to distribution of particles uniformly so that the ultimate strength of the specimen increased compared to composites which are processed with higher temperature and the holding time on 900°C cause degradation of Al/SiCp strength. This is because the particles cluster with porosity in the composite. The microspores weaken the composites. The tensile fracture was observed to occur in the brittle - ductile mode macroscopically.

In addition, the concentration of the Silicons at the interface region varies with respect to different processing temperatures, which affect the interface bonding, resulting in a variation in the ultimate strength of the composite. At 10 minutes holding time, the Silicons segregated from the SiCp above the liquidus temperature of the Al melt due to the chemical reaction between the Al matrix melt and the solid SiCp reinforcement, then the segregated Silicons are dissolved in the matrix near the interface region. The wt. % of Si increased from 11.2% to 15.6% at the interface region. The changes of the Silicons in the matrix are evaluated by the EDS analysis, this is presented in Table 4.2. The concentrations of the Silicons at the interface improve the wettability and the interface bonding strength of the composites. Similar results are found in the other 20 minutes and 30 minutes holding time experiments also.
4.6.2 Variation in Hardness in the Al/SiCp

The SiC particles added to the aluminium alloy matrix have a satisfactory effect in improving the hardness of the composites. This is to be expected since aluminium is a soft material and the SiC particles being hard, contribute positively to the hardness of the composite. The presence of stiffer and stronger particles leads to constrain the plastic deformation of the matrix during the hardness test. But, constrains to the plastic deformation depend on the distribution of the particles in the matrix. Some local regions in the composite show remarkable changes, if the particle accumulated in a particular place the values are higher, and if the particles are absent in some places the values are lower. The hardness measurements were taken in cast specimen to understand the distribution of the SiC particle in the Al alloy at different processing conditions.

The Brinell hardness number was measured along the length of the cast specimen at an interval of 1 cm. Figures 4.16, 4.17 and 4.18 show the hardness distributions along the length of the cast specimens. The value recorded for the specimen processed at low temperature (700°C) and short holding time (10 minutes) shows non uniform trends, i.e. in some places the values were close to the hardness of the Al alloy, and in some regions they were very high. The high values are obtained from the places where the particles accumulation is more, and lower hardness values were obtained from places where the SiC particles were absent.
Figure 4.16 Effect of processing temperatures on the Hardness of Al/SiCp at 10 minutes

Figure 4.17 Effect of processing temperatures on the Hardness of Al/SiCp at 20 minutes
Figure 4.18 Effect of processing temperatures on the Hardness of Al/SiCp at 30 minutes

Increasing processing temperature above 750°C and below 850°C shows an improvement in the hardness values. At 20 minutes holding time, the hardness values measured shows good results and continued holding at 10 and 30 minutes show the closer values. The each value represents an average of three recorded reading at a position. It has been concluded from the Figure 3.12 that 750°C, 800°C processing temperature with 20 minutes holding time shows better hardness distribution on cast specimen.

The hardness value is not uniform in the specimen processed at low temperature (700°C) with low holding time (10 minutes). Some places have been found with higher hardness and some places with lower hardness values. It reveals that the non uniformity of particles in the Al matrix. The increasing holding times 20 minutes, 30 minutes, the clustering of the particles were broken even at lower temperature and uniform harness value were measured. At 900°C, 850°C processing temperatures, hardness values have more variation due non uniformity of SiC particles in the matrix. This non uniformity of particles in matrix occurred due to the changes of viscosity of matrix at higher processing temperature with holding time.
4.6.3 Impact test

The influence of the microstructure on the impact characteristics was evaluated by the charpy test. The charpy test specimen was prepared from the cast specimen as per the ASTM standard as shown in Figure 4.19. The results of the charpy impact tests for Al/SiCp composites fabricated at different processing temperatures and different holding time are given in Table 4.1. The test results revealed that the impact energy of the Al/SiCp depends mainly on the distribution of the particles in the matrix. It is interesting to note that there is a slight variation in the values for the different processing conditions as shown in Table 3.3. The impact values increases slightly with increasing processing temperatures. The decrease of the impact values at lower temperatures in the Al/SiCp composites can be attributed to the presence of the brittle SiCp, which may act as a stress concentration area, where the particles are distributed uniformly.

![Figure 4.19 Standard dimensions of the charpy impact test specimen](image)

**Table 4.2 Impact values of the Al/SiCp composites**

<table>
<thead>
<tr>
<th>Processing temperatures (°C)</th>
<th>Impact values with different holding time (J)</th>
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<tbody>
<tr>
<td></td>
<td>10 Min.</td>
</tr>
<tr>
<td>700</td>
<td>3</td>
</tr>
<tr>
<td>750</td>
<td>3</td>
</tr>
<tr>
<td>800</td>
<td>4</td>
</tr>
<tr>
<td>850</td>
<td>5</td>
</tr>
<tr>
<td>900</td>
<td>5</td>
</tr>
</tbody>
</table>
4.6.4 Fractography

The macroscopic failure looks brittle in the presence of SiC particle (small ductility) but the SEM photographs indicated that fracture occurred by ductile mechanism microscopically. Figure 4.20 shows the fractography of this SEM images were taken from the broken samples of MMCs by impact test. A typical fracture surface contained large and small dimples, and tour edges. The large dimples are associated with the SiC particle and porosity, the small dimples are associated with the fine second precipitates in the matrix. Since porosity regions undergo early failure without much significant deformation of the matrix, the fracture propagates in this region. Observation of the fracture surface confirms the different types of failure mechanism that are observed during fracture: decohesion of the SiC particles from the matrix and ductile fracture of the Al matrix. A small fraction of particles seem to have been pulled out from the matrix. If the bonding strength is lower then the particle can be pulled out very easily. On the other hand, if the interface strength is higher, then the particle fracture will take place prior to interface failure.

Figure 4.20 (a), (b), (c) shows a mixed mode of dimple and non dimpled regions. This SEM images were taken from the impact tested samples. The dimple, developed in the matrix due to plastic deformation of matrix. Dimpled ductile fracture surfaces, involving matrix cavity nucleation and growth. A circle marked region (Figure 3.1 a) on SEM micrograph is porosity region; the deformation in this region is very less evidence for this. If the average particle size is high, interfacial decohesion is the dominant damage mechanism (Figure 4.20 c). Dimple formation between two decohered interfaces must therefore contribute the majority of the local work of fracture.
Figure 4.20 SEM photographs of the impact fracture surface showing broken particles at 700°C with (a) 10 Min., (b) 20 Min., (c) 30 Min.

SEM image of fractured surface shows the particle clustering regions where the damage accumulation ahead of the crack to occur more easily. The matrix surrounding the particle clustering region shows dimple in the matrix. Though the damage in this materials occurs by different mechanism, the base matrix mainly shows dimple fracture, which occurs due to the nucleation, and growth of micro voids in the base matrix. The dimple fracture surface shown in Figure 3.20 (b) confirmed the ductile failure mechanism and there was no evidence fractures particle. The particle / matrix interface remains intact indicating that the shear strength at the interface was higher than the particle fracture strength.
4.7 SUMMARY

This chapter presented and discussed the influences of the processing parameters on SiC particle distribution and some of the mechanical properties of the Al/SiCp composites. The PRMMCs were fabricated under different processing conditions using stir casting technique. The SiC particle distributions in the Al matrix were analyzed using an optical microscope. Mechanical properties such as Tensile test, Hardness test and Impact test were conducted and studied by using mechanical testing machines.