INFLUENCE OF METALLURGICAL PARAMETERS AND PROCESS PARAMETERS ON THE FLUIDITY OF AL/SICP COMPOSITES BY HORIZONTAL SQUEEZ

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ABSTRACT

THE AIM OF THIS STUDY WAS TO INVESTIGATE THE INFLUENCE OF PRESSURE PROCESS PARAMETERS, E.G., SICP CONTENT (0~20WT%), METAL MOLD TEMPERATURE, SQUEEZE PRESSURE (8~13MPA/79~132KG /CM2) AND CASTINGTHICKNESSES(REPRESENTING COOLING RATE) ON THE FLUIDITY OF THREE TYPES OF AL-MATRIX SICP COMPOSITES (A356/SICP, A413/SICP AND A390/SICP).THE EXPERIMENTAL RESULTS IN -DICATE THAT THE FLUIDITY OF THREE TYPES OFAL-MATRIX SICP COMPOSITES TEND TO DECREASE WITH THE INCREASE OF SICPCONTENT AND TEND TO INCREASE WITH THE INCREASE OF SQUEEZE PRESSURE.WHE -N THE SICP CONTENT ADDED IS MORE THAN 5WT% FOR THE A356/SICP COMPOSITE, THE FLUIDITY WILL DECREASE. WHILE, THE SICP CONTENT ADDED IS MORE THAN 10WT% FOR THE A413/SICP AND A390/SICP COMPOSITE, THE FLUIDITY WILL DECREASE. IN ADDITION, COMPARED A356/SICP WITH A390/SICP COMP -OSITES AT DIFFERENT PRESSURES, THE FLUIDITY IS INCREASED WITH PRESSURE. HOWEVER, THE PRESS URE AFFECTING ON FLUIDITY FOR A356/SICP OR A390/SICP COMPOSITES HAVE A THRESHOLD LIMIT VAL UE,ABOUT 10.4MPA/106KG/CM2. ABOVE THRESHOLD LIMIT VALUE, THE FLUIDITY ISNOT CLEARLY INCREA SED. IN ADDITION, THE FLUIDITY OF COMPOSITES IS ALSO INCREASED WITH THE INCREASE OF CASTING THICKNESS FOR ANY COMPOSION OF A356/SICP、A413/SICP AND A390/SICP COMPOSITES. FURTHERMORE, THE MICROSTRUCTURE OBSERVATION AT DIFFERENT POSITIONS OF STRIP CASTING WERE PERFORMED TO CO -RRELATE THE SOLIDIFICATION MODES WITH THE FLUIDITY OF THREE TYPES OF AL-MATRIX SICP COMPO -SITES. COMPARED WITH THE ORIGINAL ALUMINUM MATRIX ALLOYS, THE SOLIDIFICATION MODES OF A35 -6/SICP ALLOYS DOES NOT CHANGE FOR ANY CONTENT OF SICP ADDED. BUT A413/SICP AND A390/SICP ALLOY IS CHANGE FOR ANY CONTENT SICP ADDED.THE STRUCTURE AT THE STRIP CASTING OF AL-MATRIX SICP COMPOSITES POURED AT HIGH MOLD TEMPERATURE OR UNDER HIGH SQUEEZE PRESSURE REVEALS FIN -E MICROSTRUCTURE.

Keywords : SQUEEZE CASTING, AL-MATRIX SICP COMPOSITES, FLUIDITY,COOLING RATE

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