upon gauge length was also shown. From the present preliminary 2-D FEM numerical investigation, the mesoscopic internal structures of natural plant fibers were found to possibly affect the fiber strength statistical distributions as well as along- and among-fiber cross-sectional area variations, which implies a well-described distribution model for KFB tensile strength should take both of the geometrical variation and the mesoscopic internal structures into account.

**PMC-04: Plastic Deformation Ability of High Strength Natural Fiber Green Composites**

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It is expected that environment-friendly biodegradable composites reinforced by high strength natural fibers are widely used for industrial applications, preferably in place of glass fiber reinforced plastics (GFRP). However, since natural fiber strength is less than glass fiber strength, the purpose of this study is to create a new class of green composites, which cannot be exhibited by GFRP, especially in terms of toughness improvement. Ramie, one of the strongest fibers in cellulose-based natural fibers, was alkali-treated with and without load application to improve its brittleness. Biodegradable resin matrix composites reinforced by untreated and alkali-treated fibers, called natural fiber green composites, were fabricated using a press forming method. The result of tensile test of the composites showed that the alkali-treated fiber green composite increased its fracture strain twice to three times higher than the untreated fiber green composite. Especially, the alkali-treated fibers with load application changed the composites into high toughness property without loss of strength.

**PMC-05: Development and Evaluation of Ramie/Starch FW Composites**

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Although FRP are widely used due to the high mechanical properties and the environmental stability, traditional FRP cause environmental problems. In the present paper, biodegradable FW pipes were manufactured by using ramie fibers and starch resin. In order to evaluate mechanical properties of the FW pipes, tensile tests of single fibers, fiber strands, resin, unidirectional laminates and FW pipes were conducted. From the experimental results, it was found that the elastic properties of the FW pipes were almost same as the angle-ply laminates. Therefore our molding method of the pipes was appropriate for ramie/starch FW composites. From the circumferential tensile tests, it appeared that the tensile strength of 160 MPa was achieved for the parallel wound FW pipes.

**PMC-06: Improvement of Interfacial Adhesion in Bamboo Polymer Composite Enhanced with Micro-Fibrillated Cellulose**

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Current study presents one of effective techniques to improve mechanical properties of PLA (Poly-Lactic Acid)-based bamboo fiber composite. Commercially available Micro-Fibrillated Cellulose (MFC) obtained from wood pulp was applied as an enhancer to the composite. The bamboo fibers were extracted by steam explosion method and they were also rubbed in water to remove xylem (soft-wall cells). The liquid-based MFC, PLA and the bamboo fiber were mixed in water for several minutes and they were filtrated under vacuum pressure. To fabricate the composite, remained sheets were then hot pressed after dry. Three-point bending strength and Mode I fracture toughness of the composite were significantly improved, even when 10% of the MFC was added into the PLA/BF composite in weight. If small amount of MFC added into the bamboo fiber composite, tangled MFC fibers prevented the growth of micro crack along the interface between bamboo fiber and matrix.

**CAS-01: Semi-Solid Processing of A201 Aluminum Alloy**

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Although thixoforming complex near net shaped products in aluminum alloys is now an established technology in many automotive applications, current developments are taking place in three fronts: in dynamic applications for load bearing components; in alloy development (expanding the existing portfolio of thixoformable alloys) and in materials recycling. Thixoforming has seen commercialization around existing alloy compositions based on the aluminum-silicon casting 356 and 357 alloys. A number of players (both commercial and academic/research) are undertaking research in order to expand the portfolio of existing commercial alloys. This work reflects on both traditional casting A356 and high strength A201 casting aluminum alloys.

**CAS-03: High Speed Twin Roll Caster for Aluminum Alloy Thin Strip**

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A high-speed twin-roll caster for aluminum alloy is presented. The roll-caster is configured vertically with a number of improvements that increase the casting speed, including a cooling slope for low-superheat casting, copper rollers without lubricant for more rapid cooling, and a nozzle in contact with the rollers to improve casting stability. The new caster is demonstrated to achieve continuous casting of thin (<3 mm) strips at speeds of 60 m/min using 6063 and A356 aluminum alloys with up to 5 wt% Fe as an impurity phase simulating recycled aluminum alloy. The cast strip has improved microstructural properties, reducing the deterioration of material properties due to the presence of impurities.

**CAS-04: Analysis of Semi-solid Diecasting Runner-gate System as a Function of Solid Fraction**

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The injection of alloys in the semisolid state, is highly effective in reducing casting porosity, particularly the one due to turbulences during die filling. On the other hand, the use of semi-solid billet poses additional difficulties about either proper alloy re-heating and die design, especially runner and gate system. Obviously gates must be thicker than in traditional diecasting, because of the higher alloy viscosity, however no standards for a good die design are today available in the literature and each manufacturer refers to his own experience and know-how. The aim of this work is to evaluate the effect of the various runner and gate geometrical parameters on the filling pattern, taking also into account the influence of different solid fractions, not only those related to not properly controlled re-heating temperature, but also those typical of rheocasting technology. The study was carried out by means of a numerical simulation commercial software (Procast), considering a typical aluminum-silicon alloy (A356), whose thermo-fluid dynamics properties needed for simulation are mostly available. The results obtained will be subsequently used for the fabrication of an experimental die, for the production of dumb bell and toughness