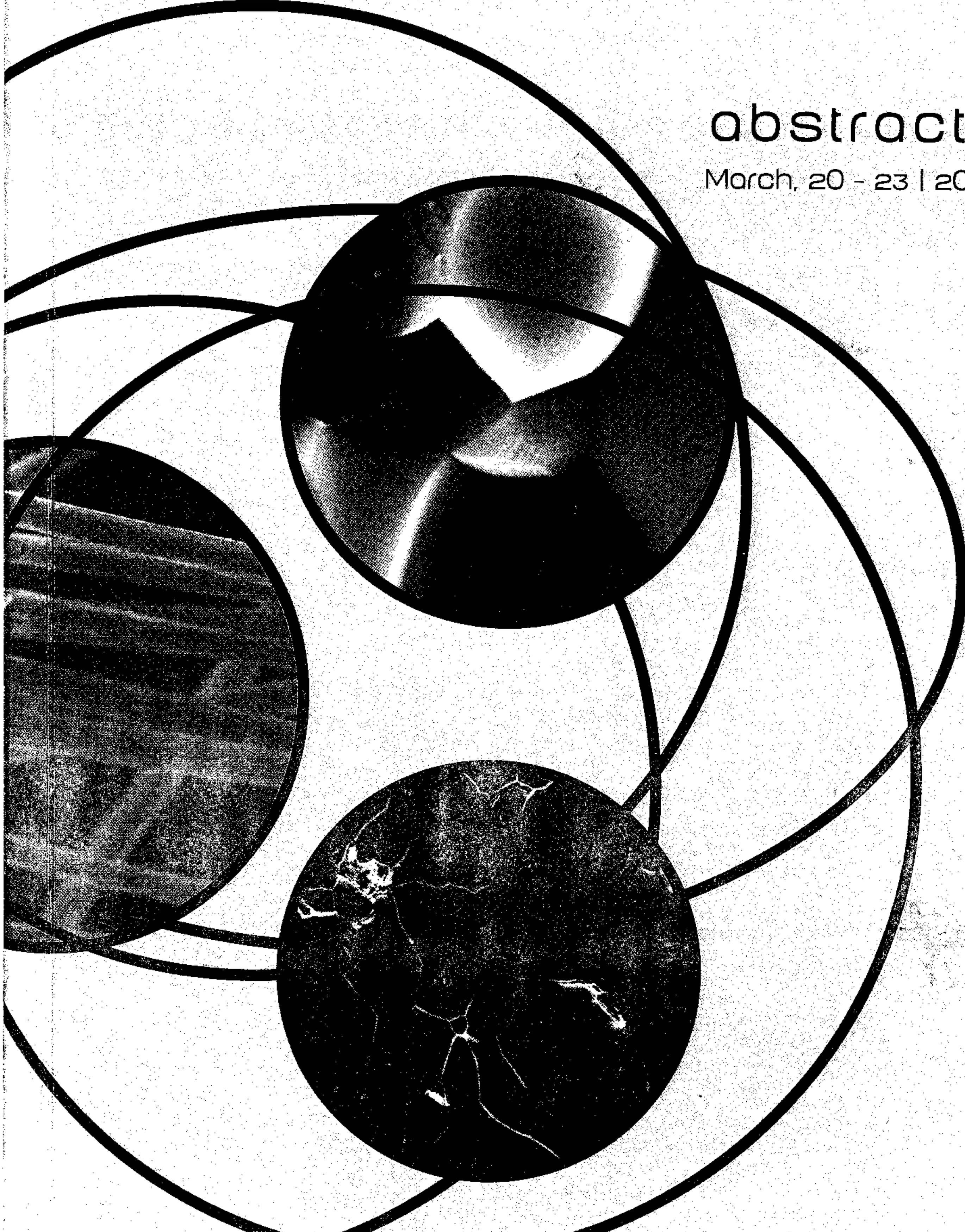
3 artigos aceites

materiais 2005

XII Portuguese Materiais Society Meeting | III International Materials Symposium spm



abstracts

March, 20 - 23 | 2005

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study was to evaluate how the level of crystallinity of PLLA based systems influence the referred parameters. PLLA disks were processed by compression of granules between metallic disks at 200 °C. Four conditions were tested: low molecular weight amorphous and semi-crystalline PLLA disks, and high molecular weight amorphous and semi-crystalline PLLA disks. For the cell culture studies a human osteosarcoma cell line (SaOS-2) was chosen. Disks were immersed in a cell suspension containing $5x10^4$ cells/ml and kept in culture for periods up to two weeks. Cell viability and proliferation of SaOS-2 cells was assessed by MTS test and a total protein assay, respectively. The adhesion and morphology of SaOS-2 cells on PLLA disks was assessed by SEM. Results showed that cell viability was not affected by the different tested conditions, as the O.D. values obtained for MTS test and total protein were very similar and no considerable differences could be found between the different samples, after two weeks in culture. Therefore it was possible to conclude, that, in the selected experimental conditions, molecular weight and crystallinity in PLLA did not influence both cell proliferation and viability. The major differences found were related to the cell morphology and their spatial distribution on the PLLA disk. While for the high molecular weight semi-crystalline samples SaOS-2 cells were showing a more flattened showing a cell growth in a monolayer pattern, cells were growing in a different fashion, and presented a more round cell morphology, denoting therefore a weaker cell attachment pattern. This is probably happening due to a better establishment of focal adhesion point by the cells on the semi-crystalline samples.

T04.P41 Properties of polymer-modified portland cement using polyurethane residues

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ASTM class I Portland cement is by far the most widely used material in civil construction and oilwell cementing. Although Portland cement develop compressive strength adequate for structural applications, limited tensile strength and high permeability are normally observed. The former aspect usually implies in reduced fracture toughness and increased brittleness of the cement, whereas the latter characteristic favors the penetration of corrosive species, which may have deleterious effects on the structural rebars. The addition of polymeric materials may potentially improve the plastic behavior of the cement as well as reduce its permeability. In this study, polyurethane residue from the industrial production of thermo-acoustic shingles was added to Portland cement. Composite slurries containing up to 5 wt.% polyurethane were mixed, homogenized, hardened, and characterized. Rheological and mechanical tests were carried out along with permeability measurements. The tensile strength of the composites was evaluated from diametral compressive tests. The results revealed that the addition of up to 3 wt.% polyurethane improved both the diametral compressive strength of the cement as well as its fracture toughness. Both permeability and sedimentation were reduced upon the addition of the polymer. Shorter set times were obtained from composite samples compared to plain cement paste. Finally, the addition of polyurethane increased the plastic viscosity and yield stress of the material.

T04.P42 Not conventional materials for a sustainable construction bioconstruction system reinforced with cellulose fibres

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The industrial hemp, cannabis sativa L, is an extraordinary plant, non-toxic and non-narcotic, that has been used for thousands of years in innumerable ends. This plant is environmental favourable, quickly renewable resource, low level of embodied energy and contains a high silica percentage in its composition.

Currently, it is manufactured not structural concrete based on cellulosed hemp fibres or hurds, activated by alkaline hydrated lime in water, suffering a mineralization process, related as petrifaction. A much more lighter material is gotten that the conventional, with excellent isolating, thermal and acoustics properties, permeable to water steam, without occurrence of superficial condensations, fire-extinguishing, bactericidal and flyers resistant, protecting the wooden structures, with a lightly cork reminiscent texture.

There are different methods of this concrete type production, concrete with pulp paper, plates of paper pulp with gypsum or fly ashes and still composites of paper pulp with hemp, over all for design pieces. However, none of these materials answers in its totality to the functional and economics requirements of our current construction. This happens because the cure time becomes extended, reduced in some cases by an addition of cement and also because of the need of a better compaction and more workmanship.

The main purpose of present research is the conciliation of hemp cellulose and paper pulp, from paper waste, with a composed agglutinant of metakaolin and lime, without cement addition. This way we will be able to get a lighter concrete with better characteristics than the ones already related, making possible blocks and plates execution, developing a prefabrication system. The final intention is the determination of the main characteristics of a composed masonry by the produced blocks, in the direction to establish an evaluation with the conventional masonry, either in thermal terms or acoustic, excusing any isolation, or in mechanical terms, getting similar resistances.

[1] http://www.canosmose.info
[2] http://www.globalhemp.com
[3] http://www.zellform.com/start_en.html
[4] http://www.suffolkhousing.org/pages/hempage.html
[5] http://hempmuseum.org/ROOMS/ARM%20BUILDING%20MAT.htm
[6] http://www.chanvre.oxatis.com/PBCPPlayer.asp?ID=59707
[7] http://www.papercrete.com

T04.P43 Not conventional materials for a sustainable construction composite agglomerate of granulated cork

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The cork, bark of the plant Quercus Suber L, commonly called cork-oak, secularly known for its reduced density, elasticity, compressibility, impermeability and thermal, acoustic and vibrate isolating efficiency.

The composite agglomerate is a resultant product of agglutination of granulated cork, resulting by production of cork products, with several substances, as rubber, plastic, asphalt, cement, gypsum, natural and synthetic resins, casein, glues and chemistries. The present research consists on development of new agglomerated, composed by cork and cellulose pulp, of waste paper. The cellulosed pulp is a self agglutinant material, when saturated and pressed join its own particles. This complementarity of raw materials provides to the agglomerate intrinsic properties to both, allow a satisfactory agglutination of granules of cork without appealing to the glue use, resins or another agglutinant material. In intention to complete the dimensional stability, to get the adequate workability and flexibility is added a small percentage of industrial hemp fibres.

The industrial hemp fibres, witch plant is cannabis sativa L, of jute, sisal, hemp and coconut fibres category.

These fibres have competed with synthetic, polymeric, mineral fibres as glass fibres and with the steel for its excellent mechanical properties, especially to the strength, durability, reduced density and low thermal conductivity. Being used in the production of isolating, MDF (Medium Density