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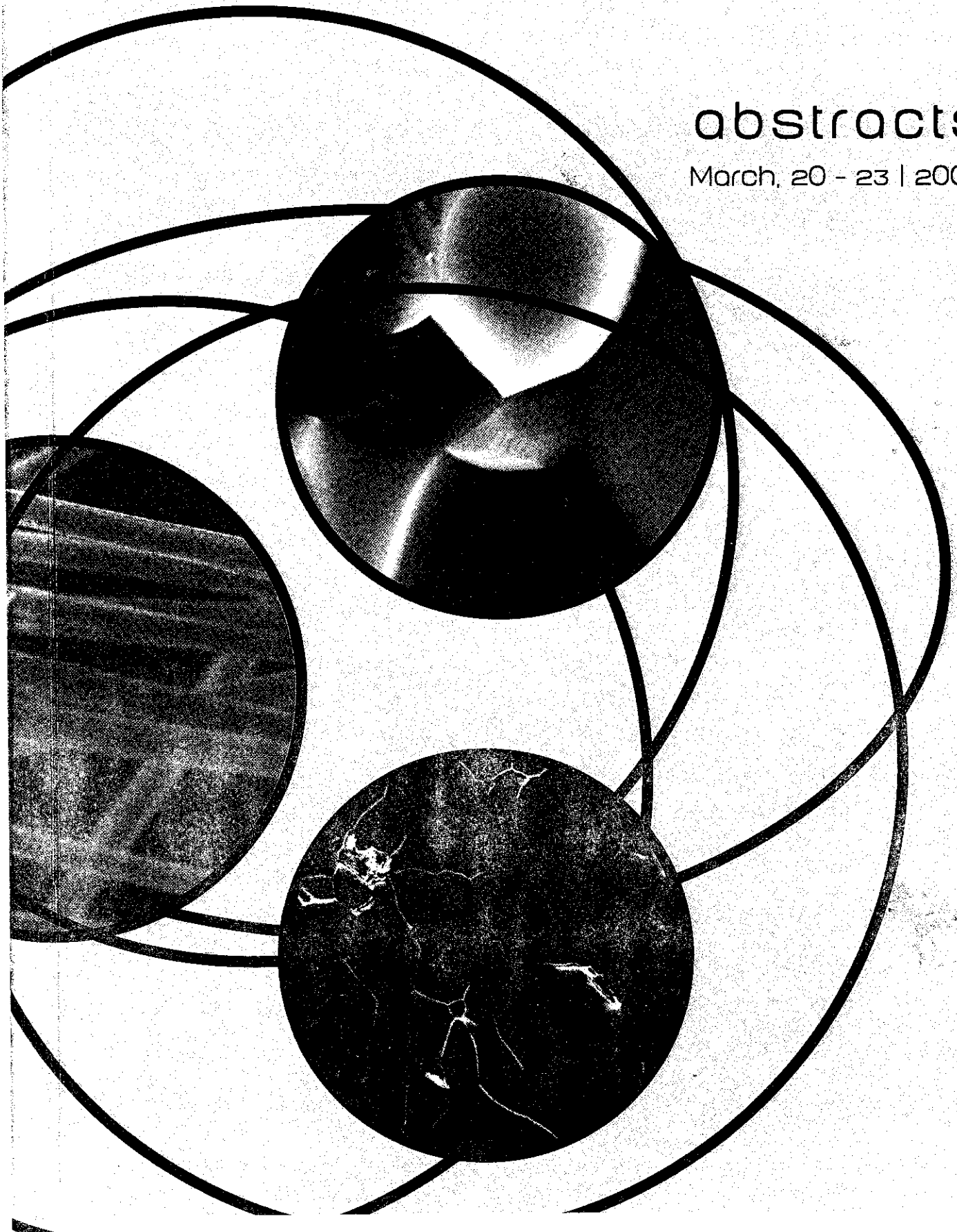

deov | university of aveiro

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.

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04.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

Fibreboard), bioplastics, getting plates, beams, rods similar to the steel and moulded products as furniture. The considered agglomerate usufruct the own constituent properties, have a similar workability to the wood, makes possible applications as the roofs isolation, attics, plain coverings, walls and the covering of some interior surfaces. Alternative that not only aims a way for sustainability, by the valuation of residues, favouring an energy and environmental saving, but is also contributing for the growth and prestige, already existing, in the Portuguese cork industry.

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T04.P44 A study on the applicability of thermoplastic composites reinforced with thermoset particles in structural applications

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Environment, recycling and saving of resources are key aspects in modern countries. Portugal imports petrol, and therefore all savings are vital for economical and strategic reasons. Thermoplastics are recyclable; therefore their use instead of thermoset plastics is quite interesting. However, thermoplastic have a reduced rigidity and strength and generally are not used for structural applications. The inclusion of thermoset reinforcement particles has a major influence on the mechanical properties of the resulting composite. The aim of present work is to study the structural applicability of recycled thermoplastic based composites with thermoset particle reinforcement. Therefore specimens were developed and manufactured to be tested in two types of mechanical properties characterization tests: tension and four-point bending. The influence of processing cycles of the thermoplastic matrix as well as the volume fraction and granulometry of the filler will be considered their mechanical behaviour characterization.

T04.P45 Correlation between the surface composition and surface free energy of polymers treated in atmospheric pressure dielectric barrier discharges

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In the present paper atmospheric pressure deposition techniques has been introduced enabling to prepare polymer materials with desired surface properties, permeability and wear resistance. Using hexamethyldisiloxane (HMDSO) and hexamethyldisilazane (HMDSZ) monomers for deposition we obtained films in wide range of the properties from polymer-like to inorganic silicon oxides or nitrides