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Lignin Based Electrospun Fibers

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Abstract

The increasing use of fossil fuels, coupled with increased awareness of our environmental impacts, has led to increased interest in using sustainable resources for new materials and energy sources. We used our own approach to the topic of using lignin for future applications. Experimental works were carried out in according to 2 methods. The first method, although it is more effective, is not desirable, for two reasons. Firstly, the process is very long (8 hours) and requires the preparation of 3 different solutions, one of which is extremely unstable. Secondly, reason is the problem of nanofilter sediment screening, which can be completely, neglected using the second method. The second method has many advantages. For instance, we can produce more lignin (the mass of lumber used with the same amount of solution is 4 times greater) in short time (~ 3 hours compared to 8 hours). The only solvents used in this method are 2 organic acids, which are stable and the extraction process is also much faster. To extract lignin, it was used different kind of sawdust – originated from pine wood and from not classified trees. There was performed an Infra Red analysis of extracted sample to determine if the experiment carried out as expected. Comparing the experimental spectra to the one acquired by Boeriu et al. the most characteristic peaks for lignin are visible in our sample (most important being: wide peak in ~3400 and characteristic peaks at 2920 and 1720).

Biography

I am Turganbay Anar Burkhatkyzy, was born on October 19, 1993. I am a Kazakh.

In 2011, I entered to the Al-Farabi Kazakh National University, on specialty “5B072000 Chemical Technology of Inorganic Substances”. Winner of the international scientific conference of students and young scientists “FARABI ALEMI 2015”. After in 2015, I entered to the Al-Farabi Kazakh National University, on specialty “6M072000 Chemical Technology of Inorganic Substances”. In 2018, I entered the doctoral program in the specialty “6D074000 - Nanomaterials and nanotechnologies”. I have written 9 articles (one of them on the Scopus Data Base) and theses.

Additive Technology for Energy Materials

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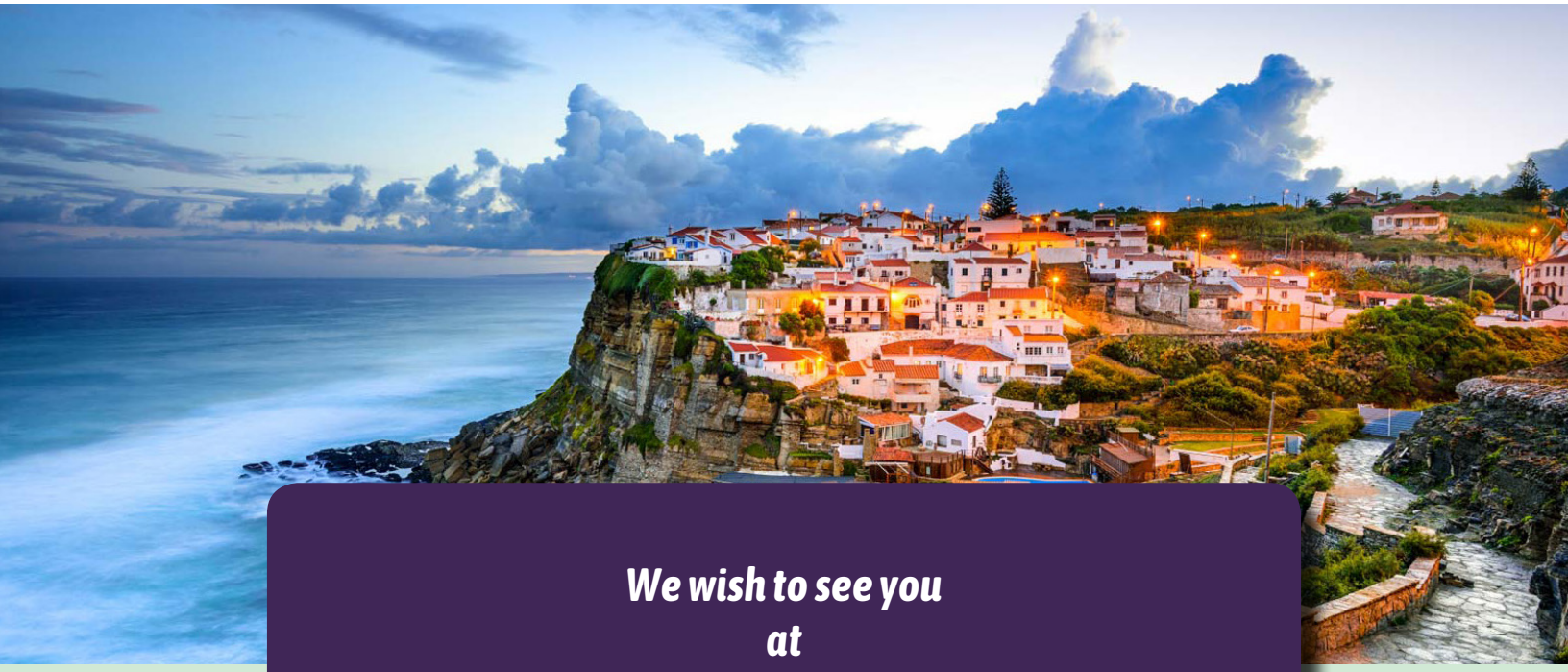
Abstract

Additive technologies are called the technology of creating products with difficult geometric shapes due to layer-by-layer synthesis or layer-by-layer growing of products using a digital 3D model.

A distinctive feature of traditional technologies is the manufacture of parts by subtracting material from the work piece; in a 3D printer, parts are built by adding material layer by layer to obtain the finished product.

This work shows the ability of 3D printing of thermite-based energy material that can be used as part of a multifunctional reactive structure. Analyzing the data, a mixture was selected consisting of a thermite mixture Al: Fe_2O_3, and nitrocellulose as a binder. The energy efficiency of this mixture will be high, since both components are high-energy compounds.

In our case, a printing system for printing ceramic mixtures is more suitable for printing, since when printing is not carried out by fusing polymers to each other. 3D inkjet printing requires a stable slurry with controlled rheology that flows easily, does not clog in the nozzle and has an effective drying process.



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