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ULTRASONIC INTENSIFICATION OF ENZYME HYDROLYSIS OF CELLULOSE

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Enzyme hydrolysis of polysaccharides in renewable lignocellulose materials has potential to develop of chemicals (sugars, extractives et al) and fuel production technologies. Slow enzyme hydrolysis reaction rate and high cost of enzyme prevent its commercial application. Mechanical activation of lignocellulose materials is a perspective method of improvement of cellulose enzyme hydrolysis. As it is known preliminary mechanical treatment of lignocellulose is ineffective activation method. So it is necessary to expose reagents to mechanical treatment simultaneously with chemical reaction. One of the ways of such chemical reaction improvement is ultrasonic treatment of reagent. Also it is well known that enzyme can be denaturated in ultrasound field, so it is impotent to study influence of ultrasound on enzyme activity.

In current research influence of preliminary ultrasonic treatment of reagents on enzyme hydrolysis of cellulose was investigated.

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INFLUENCE OF MECHANOCHEMICAL ACTIVATION ON SINTERING OF CORDIERITE CERAMICS WITH THE PRESENCE OF Bi_2O_3 AS A FUNCTIONAL ADDITIVE

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According to its exceptional electrical characteristics, such as low temperature expansion coefficient, low dielectric constant and good mechanical properties, cordierite, $2MgO{\cdot}2Al_2O_3{\cdot}5SiO_2$, represents very attractive ceramic material in the field of high temperatures. In order to accelerate the process of sintering, 1 mass% Bi_2O_3 has been added to starting mixtures. Liquid phase sintering caused by presence of bismuth-oxide leads to lowering temperature of cordierite formation. Mechanical activation of starting mixtures (0-56 minutes in vibro-mill) additionally leads to lowering sintering temperatures. Process of sintering was performed at 1200, 1300 and 1400 ^oC, for 2h. BET and PSA were employed in order to follow the changes in specific surface area and particle size of mechanically treated powders. Phase composition of starting powders and sintered materials was analyzed by X-ray diffraction method. Moreover, SEM analysis was used for analysis of powders morphology and sintered pallets microstructure.

Keywords: mechanical activation, sintering, X-ray, SEM, cordierite.