PÔSTER - RESUMO - DISPOSITIVOS ELETRÔNICOS, ELETROQUÍMICOS, SUPERCAPACITORES E BATERIAS

THERMOELECTRICITY INITIATIVE: FROM FUNDAMENTAL RESEARCH TO APPLICATION

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Developing new technologies and strategies for clean energy generation is crucial to mitigate the effects of global warming and the growing global energy demand. One alternative is the use of thermoelectric materials, which are capable of converting heat into electricity [1,2]. In this context, the initiative aims to develop a thermoelectric generator using conductive polymers. To manufacture an efficient generator, a fundamental study of the thermoelectric properties of new polymeric materials will be performed. In order to achieve materials with better thermoelectric performance, p-type polymer inks of poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOT:PSS) were synthesized via oxidative polymerization [3]. By varying the molar ratio between the oxidizing agent, 3,4-ethylenedioxythiophene monomer (EDOT), and counterion poly(styrenesulfonate) (PSS), inks with different properties were obtained. For a complete thermoelectric characterization of the studied materials, a lab-made measuring system capable of applying a temperature difference and measuring the voltage generated by the sample was used to determine the Seebeck coefficient [4]. Using the same system, but without applying a temperature gradient, the electrical conductivity was determined through IV curves. The 3w-Völklein method will be used to determine the thermal conductivity. In the next steps of this work, Naphthalene diimide (NDI)-based conjugated polymers with good thermoelectric performance will be studied as n-type materials. Moreover, transport processes related to phonons will be studied using the Terahertz beamline at Sirius, Brazilian Synchrotron Light Laboratory (LNLS) [5]. Finally, after the thermoelectric characterization of the materials, they will be applied in the fabrication of a thermoelectric generator.

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Palavras-chave: thermoelectricity; polymeric materials; phonon drag and thermoelectric generator.