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MOLECULAR MODELING AS A NOVEL AND PROMISING NUMERICAL TOOL IN MICROELECTRONICS PACKAGING

P. MATKOWSKI, A. WYMYSŁOWSKI, J. FELBA

Wrocław University of Technology, Faculty of Microsystem Electronics and Photonics,
ul. Janiszewskiego 11/17, 50-372 Wrocław, Poland

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ABSTRACT

Numerical modeling is a widespread tool in microelectronics, which is used generally for support of the prototyping stage. One of the novel numerical tools that are currently emerging is technique based on molecular modeling. Molecular modeling is well known and utilized method in chemistry, biology, medicine, biotechnology, pharmacy and physics. Scientists and researchers have been using molecular modeling to simulate reactions at the molecular levels for many years. Additionally molecular modeling is used in e.g. material modeling. Scientists are interested in material modeling and simulations because of complexity of novel materials. Many novel materials include fillers or particular structure that ensures its mechanical or electrical properties. Molecular modeling and simulations enables to control structure and properties of the materials in the nano-scale. By conducting molecular modeling researchers can obtain proposals of materials that vary in properties by low costs. Molecular modeling also ensures control of processes and prediction possibility. The current paper is focused on possible areas of application of molecular modeling in microelectronic packaging. The paper describes the current state-of-the-art and benefits of molecular modeling to selected problems common in microelectronic packages. Our goal in the future is to apply molecular modeling, as a support tool, to resolve problems that occur in microelectronic packaging as e.g. problem of surface phenomena, thin films, viscoelasticity or mechanical and thermal properties of novel materials and compounds.