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自支撑薄膜制备的研究进展

高凤菊, 郑瑞廷, 程国安

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(北京师范大学射线束技术与材料改性教育部重点实验室, 材料科学与工程系/低能核物理研究所, 北京市辐射中心, 北京 100875)

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摘要 能否成功制备自支撑薄膜不仅制约着激光和核物理研究的发展,而且限制了原子核化学试验的开展。自支撑薄膜的制备方法与普通薄膜的制备方法有很大的区别,经过近50年的发展,已经形成了一系列独特的制备方案。在成膜方面,其研究热点集中在如何降低薄膜内应力和提高材料的利用率上;同时各种可溶性衬底和脱膜剂对自支撑膜的质量有很大的影响,需要根据膜材料进行选择。总结了常见的衬底和脱膜剂及其特点,并介绍了常用的脱膜方法——漂浮法。指出自支撑薄膜制备所面临的问题主要是进一步降低膜的粗糙度,制备低应力的自支撑多层膜。

关键词 薄膜 自支撑 脱膜剂

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Research Progress in Preparation of Self-supporting Thin Film

GAO Fengju, ZHENG Ruiting, CHENG Guo'an

(Key Laboratory of Radiation Beam Technology and Material Modification of Education Ministry, Department of Materials Science & Engineering, Beijing Normal University, Beijing Radiation Center, Beijing 100875)

Abstract The development of laser physics, nuclear physics and chemical nuclear experiment is restricted by the preparation of self-supporting film. The preparation of self-supporting film is different from normal film. A series of methods has been formed in the past fifty years. Reducing the internal stresses and saving the material are important to the deposition of self-supporting film. Because the substrates and parting agents play important roles in preparation of self-supporting film, the proper one must be chosen according to the characteristic of films. This paper systematically summarizes the features of the familiar substrates and parting agents. The major method of releasing the film is the floating method. The problems in preparing self-supporting films are focused on reducing the roughness of the film and making multilayer in low stress.

Key words thin film, self-supporting, parting agent

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