吉林大学学报(工学版) 2008 38 (01): 57-60 ISSN: 1671-5497 CN: 22-1341/T

# 测量镀铬层界面韧性的激光屈曲法

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收稿日期 2006-12-21 修回日期 2007-3-6 网络版发布日期 2007-12-30 接受日期 2007-3-9

摘要 为了测量强界面电镀铬层的界面韧性，利用连续CO2
激光器对钢基体上的电镀铬层表面进行循环扫描实验。结果表明：该种加热方式能够诱发铬层沿激光扫描方向呈周期性分布的屈曲变形。在此基础上，结合涂层屈曲变形理论，提出测量镀铬层界面韧性的激光屈曲法。该方法只需对一个屈曲单元的最大屈曲高度和屈曲半长进行测量，
就可给出界面韧性。作为应用举例，利用该方法对上述镀铬层/钢基体结构界面韧性进行了测量。

关键词 材料的表面与界面 实验力学 界面韧性 镀铬层 激光屈服法 连续CO2激光器

分类号 TG174.441

# Laser buckling method to measure interfacial toughness of chromium-plating coating

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**Abstract** To measure the interfacial toughness of strong Cr-plating coating on substrate, experiment of laser periodical scanning into the surface of Cr-plating coating on steel substrate is carried out using $CO_2$ continuous laser. It is observed that this mode of heating can induce chromium coating to periodically buckle along the laser scanning direction. Based on this observation, incorporating the theory of coating buckling deformation, the laser buckling method is presented. This method can be used to measure the interfacial toughness of Cr-plating coating with the help of just one buckling unit. As a case study, the interfacial toughness of the chromium coating on steel substrate is measured by this method.

**Key words** surface and interface of materials experimental mechanics interfacial toughness chromium plating coating laser buckling method CO2 continuous laser

DOI:

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