

拉伸载荷下准脆性材料微裂纹损伤宏细观损伤变量关系初探

姜小春^{1, 2}, 谢和平^{1, 2, 3}, 周宏伟^{1, 2}

(1. 中国矿业大学 煤炭资源与安全开采国家重点实验室, 北京 100083; 2. 中国矿业大学 岩石力学与分形研究所, 北京 100083; 3. 四川大学, 四川 成都 610065)

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摘要 给出一种建立拉伸载荷下准脆性材料微裂纹损伤宏细观损伤变量关系的方法, 用于发展连续损伤力学和细观损伤力学思想相结合的损伤力学模型。通过假设宏观损伤分析和细观损伤分析所得到的有效模量等价得到宏观损伤变量的联系, 将宏观损伤变量赋予与细观损伤机制相关的物理意义, 并以单轴拉伸为例表明这种分析方法的可行性。

关键词 [岩石力学](#); [损伤力学](#); [宏观损伤变量](#); [细观损伤变量](#); [有效模量](#)

分类号

ANALYSIS OF RELATIONSHIP BETWEEN MACROSCOPIC DAMAGE AND MESOSCOPIC DAMAGE VARIABLES FOR MICRO-CRACK DAMAGE OF QUASI-BRITTLE MATERIALS UNDER TENSION

JIANG Xiaochun^{1, 2}, XIE Heping^{1, 2, 3}, ZHOU Hongwei^{1, 2}

(1. Laboratory of Coal Resources and Mine Safety, China University of Mining Technology, China University of Mining and Technology, Beijing 100083, China; 2. Institute of Rock Mechanics and Fractals, China University of Mining and Technology, Beijing 100083, China; 3. Sichuan University, Chengdu, Sichuan 610065, China)

Abstract

The connection between the continuum damage theory and the mesoscopic damage theory is always a hot and important problem in the field of damage mechanics. To develop the damage models combining continuum damage mechanics with mesoscopic damage mechanics, a new method is given to establish the relationship between macroscopic and mesoscopic damage variables for micro-crack damage of quasi-brittle materials under tension. The relationship is based on the hypothesis that the effective moduli received from the macroscopic and mesoscopic damage analysis are equivalent. The physical significance correlating with the mesoscopic damage mechanism is assigned to the macroscopic damage variable. The uniaxial tension experiment is given as an example to illustrate the feasibility of this analytic method.

Key words [rock mechanics](#); [damage mechanics](#); [macroscopic damage variable](#); [mesoscopic damage variable](#); [effective moduli](#)

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