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高地应力下岩石的真三轴试验研究

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摘要 通过真三轴试验模拟高地应力条件下地下工程开挖引起的复杂的应力路径的演化。在设定的加载方式下, 针对拉西瓦新鲜花岗岩的试验结果表明: 当卸载最小主应力时, 岩石发生回弹变形, 声发射计数率比卸载前显著增加, 增加的幅度随中间主应力的增加而逐渐提高。岩石的应力 - 应变关系为弹脆性, 峰值强度随中间主应力的增加有所提高, 峰值强度的提高值与中间主应力的比值随中间主应力的提高逐渐减小。声发射计数率峰值与应力水平有关, 峰值的次数与破坏后主裂缝的条数相对应。最后, 分析了岩石的破坏机制。

关键词 [岩石力学](#) [高地应力](#) [真三轴试验](#) [强度与变形特性](#) [声发射](#) [破坏机制](#)

分类号

TRUE TRIAXIAL EXPERIMENTAL STUDY ON ROCK WITH HIGH GEOSTRESS

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Abstract

The complicated evolvement of stress load, which is produced by excavating underground engineering under high stress conditions, is simulated through true triaxial experiment. Under the given loading method, the experimental results about new granite in Laxiwa show that the resilient deformation is found and acoustic emission counts rate is evidently enhanced when the minor principal stress is unloaded. The enhancing extent of acoustic emission counts rate increases with the intermediate principal stress. The constitutive relation is elasto-brittle. The peak value of strength increases with the intermediate principal stress; and the ratio of increasing value of limit strength and the intermediate principal stress decrease with the intermediate principal stress. The peak value of acoustic emission counts rate depends on stress state; and the amount of peak value is equal to that of major crack after failure. Finally, the failure mechanism is discussed.

Key words [rock mechanics](#) [high geostress](#) [true triaxial experiment](#) [characteristics of strength and deformation](#) [acoustic emission\(AE\)](#) [failure mechanism](#)

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