

论文

岩石破裂电磁辐射频率与弹性参数的关系

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摘要 为进一步研究岩石破裂电磁辐射特征, 本文根据岩石破裂电磁辐射是由岩石破裂时产生带电粒子扰动引起的假说, 通过断裂力学理论中的张开位移法计算岩石破裂过程中的裂纹宽度, 由电磁辐射频率与破裂宽度之间的关系, 研究电磁辐射频率与弹性参数之间的关系, 并给出了它们之间的关系表达式. 通过建立具有中心贯穿裂纹的无限大平板模型, 根据破裂宽度计算了在该模型条件下几种岩石破裂过程中产生电磁辐射频率范围. 理论模型计算出来的频率范围主要集中在实验观测的中高频段, 并体现出频率随弹性参数的变化.

关键词 [岩石破裂](#) [电磁辐射](#) [张开位移](#) [频率](#) [弹性参数](#)

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Relationship between frequency of electromagnetic radiation induced by rock fracture and the elastic parameters

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Abstract In order to know much more about the characteristics of electromagnetic radiation induced by rock fracture, this study assumes that the electromagnetic radiation is created by the atomic perturbation during rock fracture, and uses the Crack Opening Displacement method to calculate the crack width. We find out the relationship between the frequency and the elastic parameters. By the model of infinite flat with impenetration crack model, we calculate the frequency range of the electromagnetic radiation during several rock fracture which is from middle to high frequency. The results indicate that the frequency changes with the elastic parameters.

Key words [Rock fracture](#); [Electromagnetic radiation](#); [Extentional displacement](#); [Frequency](#); [Elastic parameter](#)

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