

论文

煤岩摩擦过程表面电位特征规律实验研究

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摘要:

实验研究了煤岩摩擦过程中表面电位及其变化规律, 初步探讨了煤岩摩擦表面电位变化机理。结果表明: 煤岩摩擦过程中有表面电位产生, 并且与载荷有较好的对应关系。煤岩摩擦过程分别经历了静摩擦阶段和动摩擦阶段, 且动摩擦阶段的表面电位信号强于静摩擦阶段。岩石摩擦过程表面电位信号基本呈正负双向突变, 摩擦面两侧表面电位极性相反, 具有对称性; 煤样摩擦过程表面电位信号基本呈单向突变, 摩擦面两侧表面电位极性对称不显著。煤岩摩擦引起表面电位发生变化可由摩擦起电、热电子发射和场致电子发射等机制解释。

关键词: 煤岩; 摩擦过程; 表面电位

Experiment study on surface potential characteristics and rules during coal or rock friction process

Abstract:

The experiment was made on the rules of surface potential of coal or rock during friction process. The mechanism producing surface potential of coal or rock friction was discussed initially. The results show that surface potential can be produced during coal or rock friction process, and it has a better corresponding relationship with load. The coal or rock friction process can be divided into two stages: static friction stage and kinetic friction stage. The surface potential signal in kinetic friction stage was stronger than that in static friction stage. During rock friction process, the polarity of surface potential signal was basically bidirectional mutation, and the polarity of surface potential on both sides of friction surface had obvious symmetry. While the polarity of surface potential signal was basically unidirectional mutation in coal friction process, and the polarity of surface potential on both sides of friction surface was not in significant symmetry. The changes of surface potential during coal or rock friction process can be explained by mechanism of electricity produced by friction, thermionic emission and field electron emission.

Keywords: coal rock; friction process; surface potential

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