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论文

井孔声电效应转换电磁波的特征

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摘要: 为探索声电效应在测井技术中的应用前景,利用微弱信号检测技术对岩石的声电效应进行了实验研究,在模型井孔中不同矿化度的条件下同时记录声波与电磁波信号,对比分析研究声波和电磁波的特征.结果表明所记录的电磁波信号为声波在井孔中传播时激发的转换电磁波.在频谱分析中发现,转换电磁波在频率谱上存在对称的双主频峰.声波在井孔中传播时激发的伪瑞利波产生声电转换,形成转换电磁波.

关键词: 井孔 声电效应 转换电磁波 测井

The converted electromagnetic wave characteristics of seismoelectric conversion effect in borehole

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Abstract: Acoustic wave and electromagnetic wave signals were recorded in the model borehole on the condition of different salinity by using the weak signal detection technology for investigating the seismoelectric conversion effect and exploring its potential application in well logging. The characteristics of the

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electromagnetic wave were analyzed by comparing with the acoustic wave. The results show that the electromagnetic wave is the converted electromagnetic wave induced by the acoustic wave when it propagates along the borehole. We found that the converted electromagnetic wave has symmetrical two dominant frequency crests in the spectrum. Pseudo Rayleigh wave induces the seismoelectric conversion and radiates the converted electromagnetic wave in the borehole.

Keywords: Borehole Seismoelectric conversion effect Converted electromagnetic wave Well logging

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