

新科学新技术新方法

基于电容率法的矿藏勘探新方法研究

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摘要:

重点介绍了NaCl溶液的电容随着溶液矿化度、测量极板之间的距离以及测量频率的变化规律。结果表明,在直接测量电容的情况下,NaCl溶液的电容随着极板距离的增加按负平方关系减小;随着溶液浓度的增加按平方关系增加;随着频率的增加按负幂指数规律减小。通过和NaCl溶液电阻的对比发现,同样的条件下,电容的变化率比电阻明显,这将有助于地层流体的识别,尤其是目前大量存在的水淹油气层、低阻油气层和薄油层。基于以上结论,提出了第二介电常数的概念,第二介电常数不同于传统介电常数的关键之处在于:第二介电常数是直接测量介质的介电特性,而不是将其置于极板之间进行测量。还指出,在进行交流电测井时,地层的电容信号也同样能反映出地层及其孔隙流体的特征,在此基础上提出了电容率法测井的想法,即在测量地层电阻率的同时,还要进行电容率的测量,来反映地层及其孔隙流体电容率的信息。此外,还提出了两电极法进行地面电容率勘探的设想,这种方法不仅能够用于找油找气,还可以探测金属矿藏。

关键词: NaCl溶液;介电常数;电容 电阻;测井;电法勘探

Study on a new method of exploration based on reservoir capacitvity

Abstract:

Abstract: This paper introduces the law that the capacitvity of NaCl solution changes with different salinity, different concentration and different measurement frequency. The experiments show that capacitvity of NaCl solution increases in square law with the concentration increasing, decreases in negative exponent law with the frequency increasing and decrease decreases in negative exponent law with the pole distance increasing. Comparing with resistance of NaCl solution, it shows capacitvity change larger than resistance at same condition. Based on the results of these experiments, this paper provide a new concept, that is the secondary dielectric constant whose distinctive difference with dielectric constant is that directly detect the dielectric characteristics of electrolyte. This paper also provides a new exploration method, surface capacitvity exploration, the new instrument can be improved on the Dual-laterolog apparatus. By this method, it can not only detect oil or gas reservoir, but also detect other mental ores.

Keywords: NaCl solution, dielectric constant, capacitance, resistance, well logging, electric exploration

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