

基于双D光纤传感器的陶瓷泥浆浓度仪的设计

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摘要:

依据Mie散射理论, 在入射波长、入射光强、探测距离、粒径尺寸参量、折射率, 后向散射角已知时, 后向散射光强就与粒子数浓度成正比。在实验中, 把光信号通过双D型光纤传感器中的一支光纤射入陶瓷泥浆, 另一支光纤接收陶瓷泥浆颗粒对光信号的后向散射光线。分别检测浓度为40%-60%的陶瓷泥浆样本, 记录、分析这组电压值和陶瓷泥浆浓度的关系后知道: 在陶土含量为40%-60%之间的数据曲线是线性的。利用这一个结果, 研制了陶瓷泥浆浓度检测仪, 并详细说明陶瓷泥浆浓度检测仪的结构及特点。

关键词: 双D型光纤传感器; 后向散射; 陶瓷泥浆浓度; 检测

Design of ceramic mud concentration detector based on double-D optical fiber sensor

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Abstract:

Based on the Mie Scattering theory, if incident wavelength, incident intensity, detection distance, particle size, refractive index and backscattering angle are all known, intensity of backscattering light is proportional to concentration of particle. In the experiment, one of the laser optical fiber irradiates ceramic mud through a double-D optical fiber sensor, the other receives the backscattering laser light goes through the ceramic mud. The ceramic mud of concentration of 40%-60% are measured, the measured voltage and its corresponding ceramic mud's argil content relationship was analyzed, it is liner for ceramic mud of concentration between 40%-60%. ceramic mud concentration detector is designed based on result of study, the detailed description of structure and characteristics about ceramic mud concentration detector.

Keywords: double-D optical fiber sensor; backscattering; concentration of ceramic mud; detection

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