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铝合金板坯连铸过程的DPIV物理模拟

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摘要: 利用先进的数字粒子图像测速技术(DPIV)对铝合金板坯连铸过程中结晶器内的流场进行研究。分析了操作参数以及浮漂漏斗结构对流场的影响。考虑到液固界面的影响, 实验采用与枝晶生长结构相似的天然海绵模拟液固界面。结果表明: 随着拉坯速度的增大, 表面越不稳定; 可通过适当增加出水口向下的倾角来提高拉速; 跑道形出水口要优于矩形出水口。

关键字: 铝合金; 连铸; 结晶器; DPIV; 物理模拟

DPIV physical simulation of melt flow in mould during continuous casting of aluminium alloy slab

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Abstract: The fluid flow phenomena happened in the mould of continuous casting of aluminium alloy was studied by digital particle image velocimetry (DPIV) technology. The influence of operation parameter and floating distributor structure on flow field was analyzed. Taking into account the impact of fluid-solid interface in experiment, a natural sponge whose micro-structure is similar to dendrite structure was employed to simulate liquid-solid interface. The results show that the faster the pulling rate is, the more turbulent free the surface is. The pulling rate can be increased by increasing port angle adequately, and the racetrack ports are better than the rectangular ones.

Key words: aluminium alloy; continuous casting; mould; DPIV; physical simulation

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