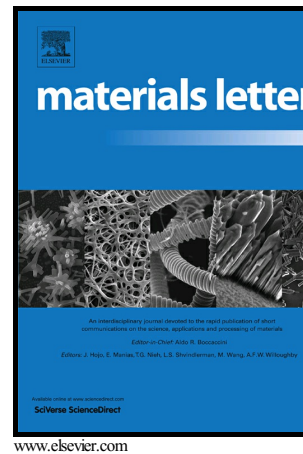


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Application of ultrasonic treating to degassing of commercially pure copper melt: A preliminary investigation

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A preliminary investigation

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Abstract

The effect of ultrasonic treatment (UST) on degassing of commercially pure copper (CP-Cu) has been studied by both reduced pressure test (RPT) and direct hydrogen, oxygen measurement, and the results show that UST has a significant degassing effect for the CP-Cu melt. The achieved results indicate that UST would be an alternative process for molten Cu degassing.

Keywords: Cast; Solidification; Metallurgy; Ultrasonic degassing; Commercially pure copper

1. Introduction

As for most metals, the solubility for hydrogen in commercially pure copper (CP-Cu) falls from over 5 ml/ 100g to about 2 ml/ 100g during solidification [1]. In casting CP-Cu, two different approaches to degassing by solidification processing are currently pursued: (a) chemically degassing; by adding rare earth element, lithium, calcium or other degassing agents and (b) physically degassing; by purging with an inert gas (N₂, Ar) or vacuum treating [1-2]. Although many studies concerning ultrasonic degassing (USD) mainly focus on the light alloy melts (Al, Mg) [3-5], few works on melt degassing have been made with the application of ultrasonic vibration for the heavy non-ferrous metal melts (such as Cu). This article reports the initial experimental results obtained from different effect on process parameters of USD on CP-Cu.

2. Experimental method

The material used is 99.7% (Wt %) CP-Cu ($T_L=1083$ °C) bars. The transducer is capable of

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