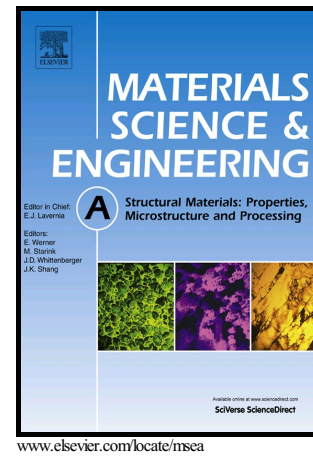


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**Effects of minor Sr addition on the microstructure, mechanical properties and creep behavior of high pressure die casting AZ91-0.5RE based alloy**

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## **Abstract**

Effects of minor Sr ( $x = 0, 0.2, 0.6, 1.0$  wt.%) addition on microstructure, mechanical properties and creep behavior of high pressure die casting AZ91-0.5RE based alloys were thoroughly investigated. Experimental results show that the addition of Sr to HPDC AZ91-0.5RE based alloys can refine the microstructure including externally solidified crystal  $\alpha$ -Mg and eutectic compound  $\beta$ -Mg<sub>17</sub>Al<sub>12</sub>. On the other hand, when the content of Sr reaches 1.0%, a small amount of plate-like Al<sub>4</sub>Sr phase can be formed. Moreover, minor of Sr addition can significantly decrease the volume fraction of  $\beta$ -Mg<sub>17</sub>Al<sub>12</sub> precipitates of AZ91-0.5RE based alloys. In addition, the mechanical properties of AZ91-0.5RE based alloys can be improved remarkably with Sr addition, and the alloy containing 0.2% Sr exhibits the best mechanical properties at ambient temperature. Fractographic analyses demonstrate that the fracture modes of the alloy without and with Sr are quasi-cleavage fracture and ductile fracture, respectively. Furthermore, Creep properties of HPDC

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