

熱壓鑄超級鋅鋁合金抗磨耗性質研究

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摘要

ZA族鋅鋁合金擁有極優異的機械性質和抗磨耗行為，其強度除高於鑄造鋁合金和一般鑄鐵外，硬度亦佳，且較鋁合金、鎂合金和鈦合金低廉，又其具備較鋁合金、鑄鐵或軸承青銅合金更易鑄造之特性。本研究係針對三種不同高鋁含量之ZA族鋅鋁合金進行抗磨耗性之研究，磨耗方式係採用pin-on-disc (POD)，以三種鋅鋁合金ZA-8、ZA-12和ZA-27進行磨耗測試，比較每段磨耗距離下磨耗量之差異。再利用OM及SEM觀察磨耗的剖面及表面變化以瞭解不同鑄造參數下ZA合金的磨耗趨勢。研究結果顯示，在壓鑄或重力鑄造條件下，ZA-27鋅鋁合金鑄件較ZA-12及ZA-8鋅鋁合金擁有較佳的耐磨耗性。比較澆鑄溫度、模具溫度和澆鑄壓力之製程參數後，顯示液相限溫度 - 10 為三種鋅鋁合金之最佳澆鑄溫度，但澆鑄溫度對ZA-8合金之抗磨耗性影響程度較不明顯。其次在150 之模具溫度，三種ZA鋅鋁合金皆具有較低的磨耗率。在澆鑄壓力100kg/cm²時，ZA-8、ZA-12和ZA-27鋅鋁合金擁有較低之磨耗率。在重力鑄造條件下，澆鑄溫度之影響亦顯示與壓鑄有相似之趨勢。在微小硬度試驗中，磨耗表面之表面硬化層明顯高於合金基地，在次表面之流動層則因晶粒拖曳變形造成軟化，其硬度值為最低。

關鍵詞：ZA-8，ZA-12，ZA-27鋅鋁合金，熱室壓鑄，抗磨耗性

目錄

封面內頁 簽名頁 授權書	iii	中文摘要	iv	英文摘要	v
誌謝	vii	目錄	viii	圖目錄	xii
.....	xix	符號說明	xxii	第一章 前言	1
.....	2	2.1 壓鑄法	2	2.2 壓鑄應用範圍及發展趨勢	3
.....	4	2.3.1 冷室壓鑄法	4	2.3.2 熱室壓鑄法	4
.....	5	2.5 模具溫度	6	2.6 充填時間	6
.....	7	2.7.1 壓鑄用合金應具備的鑄造特性	7	2.7.2 壓鑄用合金之材料特性	8
.....	8	2.8.1 鋅合金的特徵	9	2.8.2 鋅合金的優點	9
.....	10	2.9 其他成分對鋅合金之影響	11	2.10 晶界腐蝕	12
.....	13	2.11.1 熔湯的流動與鑄件氣孔的關係	13	2.12 磨耗機構	15
.....	16	2.12.2 降低磨耗係數	22	2.13 磨耗試驗法	25
.....	27	2.13.1 3號鋅合金	29	2.13.2 7號鋅合金	29
.....	29	2.13.3 ZA-27鋅合金	29	2.13.3 ZA-27鋅合金	29
.....	29	2.13.4 微結構	31	第三章 實驗方法及步驟	43
.....	43	3.2 實驗材料與設備	43	3.3 參數設定	44
.....	44	3.4.1 電腦輔助設計	44	3.4.2 電腦輔助模擬分析	45
.....	45	3.6 壓鑄件之試片製作	46	3.6.1 磨耗試片	46
.....	46	3.7 磨耗試驗	47	3.8 顯微結構觀察	47
.....	48	3.9 微小硬度測試	47	3.9 微小硬度測試	47
.....	48	第四章 結果與討論	60	4.1 澆鑄溫度與磨耗之關係	60
.....	62	4.3 澆鑄壓力與磨耗之關係	64	4.2 模具溫度與磨耗之關係	66
.....	66	4.4 磨耗表面觀察	66	4.4.1 澆鑄溫度之磨耗表面觀察	66
.....	70	4.5.1 澆鑄溫度之磨耗剖面比較	70	4.5.2 模具溫度之磨耗剖面比較	73
.....	73	4.6 微小硬度量測	74	4.7 OM之顯微結構觀察	76
.....	73	4.6 微小硬度量測	74	4.7 OM之顯微結構觀察	76
.....	76	第五章 結論	136	參考文獻	138

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