

能源和环境工程

金属间化合物SbSn的掺Al制备及原油乳液脱硫

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摘要

将Sn粉、Sb粉和少量的Al粉混合,通过球磨法制备出掺Al的金属间化合物SbSn,再采取碱洗溶脱的方式除Al以期增加SbSn合金的比表面积。采用XRD、BET、DSC等分析方法对其相结构、比表面积和熔点进行表征。当掺Al量为5%时,比表面积扩大7倍多。结果表明:比表面积扩大有利于脱硫率的增加。将比表面积 $6.43 \text{ m}^2 \cdot \text{g}^{-1}$ 的SbSn负载于丝网上作介质,在外置电场电压为12.54 V,表面活性剂用量为0.19%,[JP+2]反应时间为18 h后,W(20)/O(80)乳液的脱硫率可达到37.9%。脱硫的反应机理可解释为在电流的诱导作用下,SbSn与硫化物产生电化学反应和脱Al后合金表面产生的空缺位等活性点的物理吸附共同作用的结果。

关键词

[掺铝](#) [金属间化合物](#) [机械合金化](#) [乳化](#) [电场](#) [脱硫](#)

分类号

Preparation of SbSn intermetallic compound with Al addition and desulfurization behavior for emulsion of crude oil

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Abstract

SbSn intermetallic compound with Al addition was prepared via ball milling ,when Sb and Sn powders were mixed with a small amount of Al powder.By removing Al by alkali dissolution, the specific surface area of SbSn alloy was expected to enlarge.The bulk phase structure, specific surface area and melting point were determined by XRD, BET and DSC.Its specific surface area was enlarged more than 7 times when Al addition was 5%.The results showed that expansion of specific surface area was favorable for increasing desulfurization efficiency.When surfactant addition was 0.19%, reaction time was over 18 h , voltage was assigned at 12.54 V, desulfurization efficiency reached 37.9% for emulsion of W(20)/O(80) using specific surface area of SbSn $6.43 \text{ m}^2 \cdot \text{g}^{-1}$ supported on wire mesh as medium.The desulfurization mechanism was explained that there was electrochemical reaction between sulfide and SbSn surface under electric current induction, in combination with physical adsorption on active sitelike vacancy caused by removing Al on alloy surface.

Key words

[aluminium addition](#) [intermetallic compound](#) [mechanical alloying](#) [emulsion](#) [electric field](#) [desulfurization](#)

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