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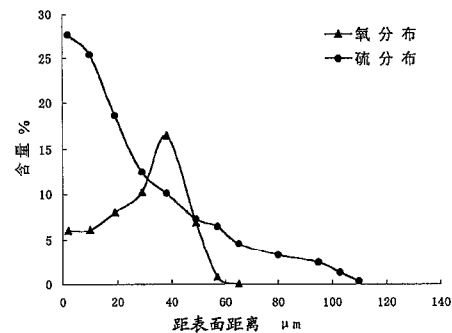
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权利要求书 2 页 说明书 8 页 附图 5 页

[54] 发明名称 具有良好润滑耐磨性能的金属基复合梯度材料、其制造方法和用途

[57] 摘要

公开了一种具有良好润滑耐磨性能的金属基复合梯度材料，其特征在于，该材料以金属 M 为基，并在其表面存在一个金属硫化物 M [S] 和金属氧化物 M [O] 的复合梯度层，在该复合梯度层内 M [S] 的浓度  $D_s$  与 M [O] 的浓度  $D_o$  之和  $D_s + D_o$  从表面到内部逐步降低，而金属 M 的浓度  $D_m$  从表面到内部逐步增加。还公开了上述复合梯度材料的制备方法和该材料的用途。





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(12) **United States Patent**  
**Zhang et al.**

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(54) **METAL-BASED GRADIENT COMPOSITE MATERIAL HAVING GOOD LUBRICATION AND WEAR RESISTANCE PROPERTY, THE PRODUCTION AND THE USE OF THE SAME**

**FOREIGN PATENT DOCUMENTS**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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§ 371 (c)(1),  
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(30) **Foreign Application Priority Data**

(57) **ABSTRACT**

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428/908.8; 428/941  
(58) **Field of Search** ..... 428/697, 698,  
428/908.8, 941, 610; 148/518; 204/192.12,  
192.15, 192.16

This invention is related to a metal-based gradient composite material having good lubrication and wear-resistance properties. The composite material comprises a metal (M) matrix and a gradient composite layer of metal sulfide (M[S]) and metal oxide, (M[O]) on the surface of said metal matrix. In the gradient composite layer, the sum (Ds+Do) of the concentration of metal sulfide (Ds) and the concentration of metal oxide (Do) decreases gradually from the surface to the interior, and the concentration of metal (D<sub>M</sub>) increases from the surface to the interior. The invention is also related to a process for producing the gradient composite material and the use of the same.

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**9 Claims, 5 Drawing Sheets**

Gradient distribution of sulfur and oxygen in No.20 steel

