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Liu et al.

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(54) **FE-NI-P-RE MULTICOMPONENT ALLOY PLATING LAYER, AND ELECTRODEPOSITION PREPARATION METHOD AND APPLICATION THEREOF**

(52) **U.S. Cl.**
CPC *C25D 3/562* (2013.01); *B32B 15/015* (2013.01); *C25D 3/56* (2013.01); *C25D 5/34* (2013.01); *C25D 21/12* (2013.01); *C25D 21/14* (2013.01)

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(58) **Field of Classification Search**
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(Continued)

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§ 371 (c)(1),

(2) Date: **Oct. 13, 2015**

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(30) **Foreign Application Priority Data**

Oct. 16, 2013 (CN) 2013 1 0489128

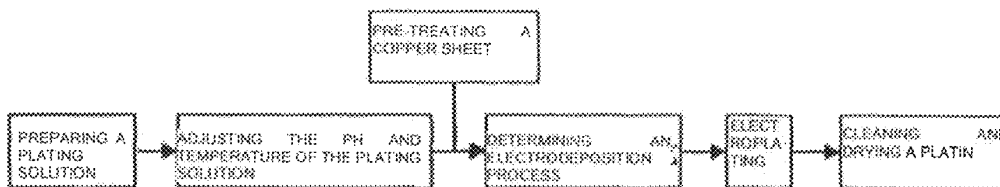
(57) **ABSTRACT**

An Fe—Ni—P-RE multicomponent alloy plating layer, electrodeposition preparation method, and plating application. The alloy plating layer obtained via electrodeposition contains elements Fe, Ni, P and RE, with the following mass percentages Fe— 16%-65%, Ni— 25%-70%, combined Fe and Ni— 63%-91%, RE 1.6%-25%, and the balance being P. The plating solution mainly contains the following com-

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ponents: ferrous salt, nickel salt, NaH₂PO₂, RECl₃, H₃BO₃ and Na₃C₆H₅O₇. A multicomponent alloy plating layer of different components can be obtained by adjusting the main salt and complexing agent in the plating solution and by adjusting the process Enabled is controllable adjustment to the components of the obtained plating layer while saving costs, improved characteristics such as the thermal expansion coefficient, electrical property, magnetic property, etc., and products and methods very suitable for applications in the field of micro-electronics.

13 Claims, 9 Drawing Sheets

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- (58) **Field of Classification Search**
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 See application file for complete search history.

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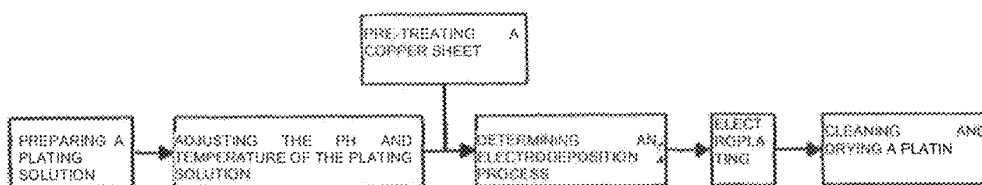


Figure 1

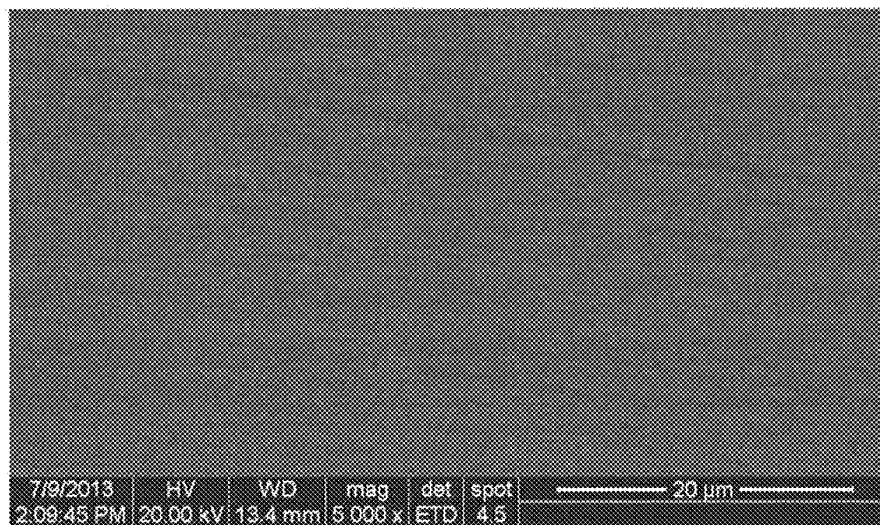


Figure 2

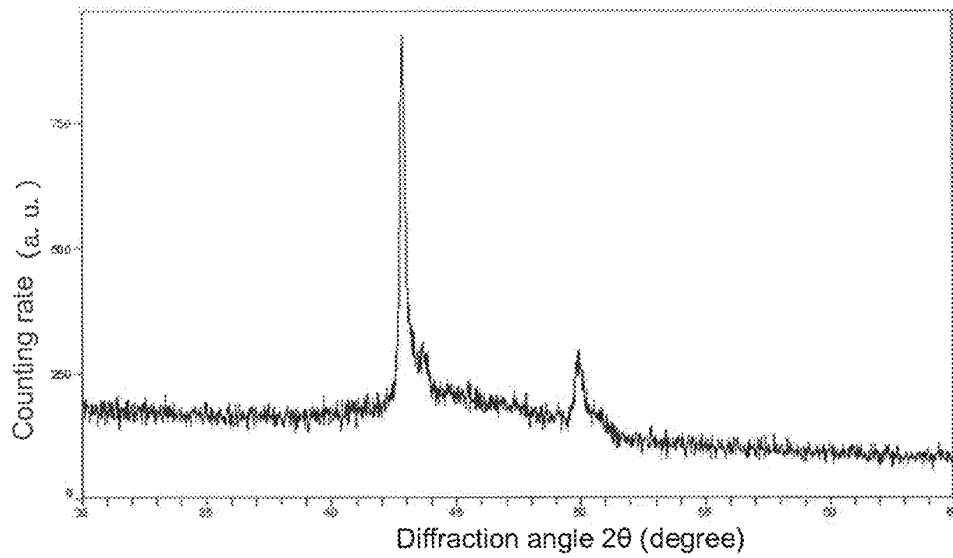


Figure 3

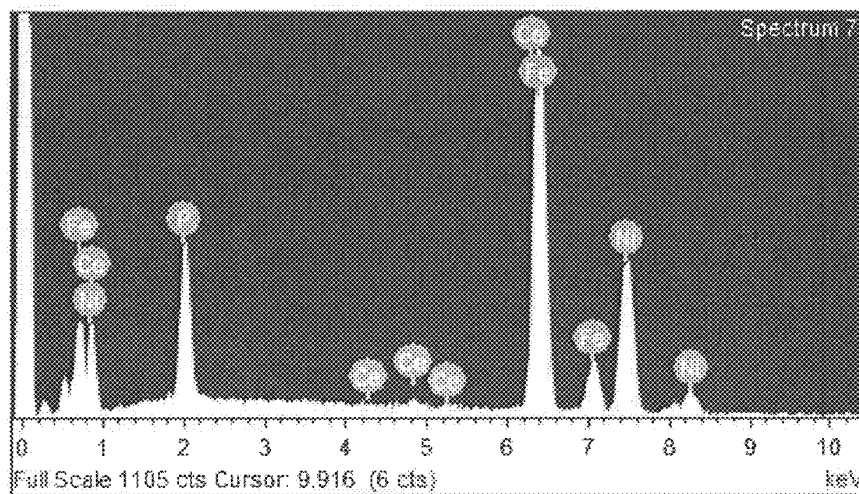


Figure 4

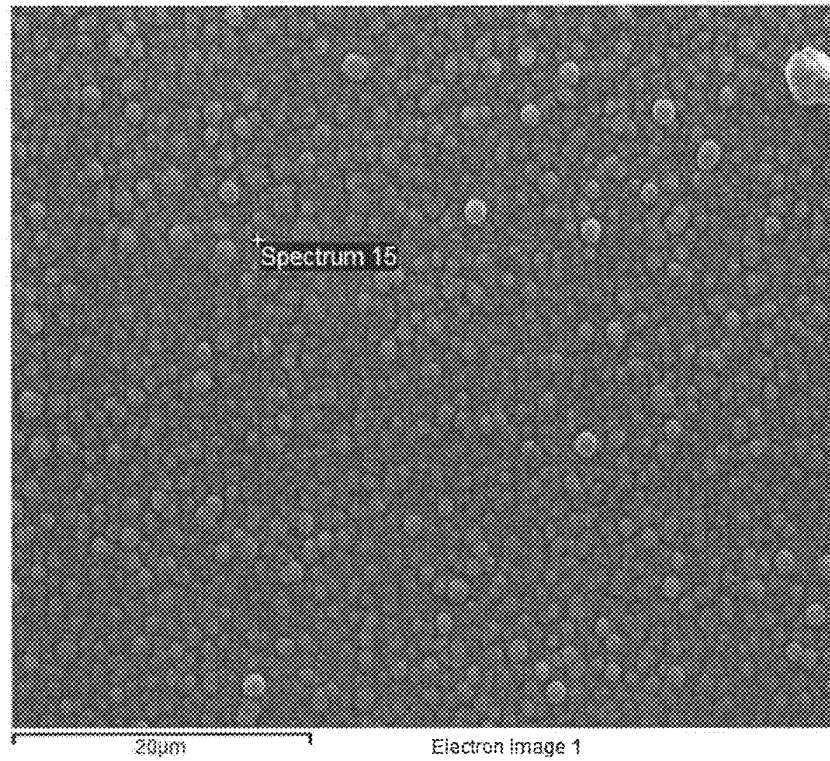


Figure 5

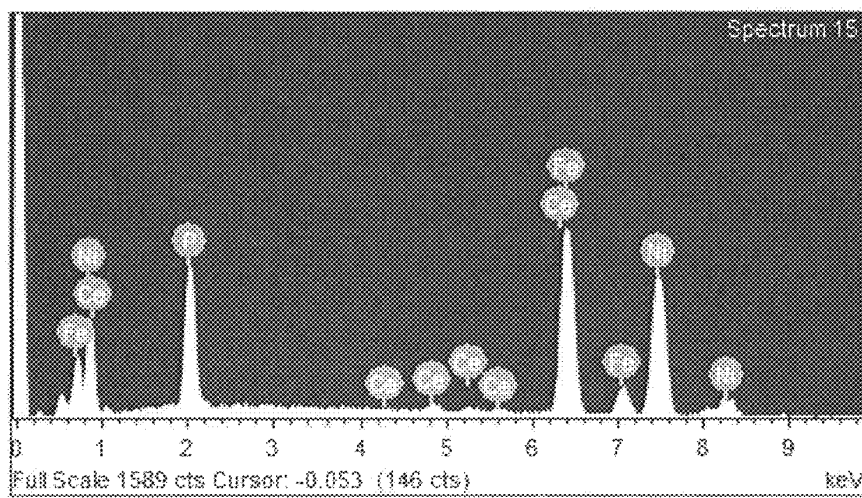


Figure 6

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