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A facile process to manufacture high performance copper layer on ceramic material via biomimetic modification and electroless plating

Yan Wang, You-he Xu, Zhi-yuan Cao, Chuan Yan, Kang Wang, Jin-ju Chen, Chuan Yan, Zhe-sheng Feng



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1 **A facile process to manufacture high performance copper layer on ceramic**
2 **material via biomimetic modification and electroless plating**

3 Yan Wang, You-he Xu, Zhi-yuan Cao, Chuan Yan, Kang Wang, Jin-ju Chen, Chuan Yan,
4 Zhe-sheng Feng*

5 School of Materials and Energy, University of Electronic Science and Technology of China,
6 Chengdu, 610054, PR China

7 **Abstract:**

8 A convenient and eco-friendly approach to fabricate high-quality copper layer on ceramic
9 via surface modification combined with electroless plating is introduced in this paper. Through the
10 surface modification of polydopamine, alumina ceramic substrate is capable of adsorbing silver
11 ions, which could create an activating layer to catalyze the subsequent electroless copper plating
12 (ECP) at low temperature. The finding that modification could obviously enhance the adhesion
13 between substrates and copper layers are evaluated by water contact angle measurement, XPS,
14 FT-IR, SEM, EDS and adhesion tests. Moreover, after 30 min of ECP, the resulting deposited
15 copper layer presents an excellent performance in adhesion (highest level in ASTM D3359)
16 and conduction (up to $4.2 \times 10^7 \text{ S} \cdot \text{m}^{-1}$, nearly 70 per cent of bulk copper). This technology might
17 provide a potential way to realize surface metallization on ceramic substrates applied in electronic
18 circuits and devices.

19
20 **Keywords:** ceramic; polydopamine; surface modification; electroless copper plating; adhesion.

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