Supporting Information

A facile metal-phenolic-amine strategy for dual-functionalization of blood-contacting devices with antibacterial and anticoagulant properties†

QiufenTu,‡[a] Xuehong Shen,‡[a] Yaowen Liu,[b] Qiang Zhang,[c] Xin Zhao,[c] Manfred F. Maitz,[d] Tao Liu,[e] Hua Qiu,[a] Jin Wang, Nan Huang,*[a] and Zhilu Yang,*[a]

[a]Key Lab. of Advanced Technology for Materials of Education Ministry, School of Materials, Southwest Jiaotong University, Chengdu, 610031, China.

E-mail: huangnan1956@163.com; zhiluyang1029@swjtu.edu.cn

[b]Department of Biomedical Engineeering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China

[c]College of Food Science, Sichuan Agricultural University, Yaan, 625014, China,

[d]Max Bergmann Center of Biomaterials, Leibniz Institute of Polymer Research Dresden, Hohe Strasse 6, 01069 Dresden, Germany

[e]Medical College of Acu-Moxi and Rehabilitation, Guangzhou University of Chinese Medicine, Guangzhou 510006, China

†Electronic supplementary information (ESI) available. See DOI: XXX

‡ Qiufen Tu and Xuehong Shen contributed equally to this work.

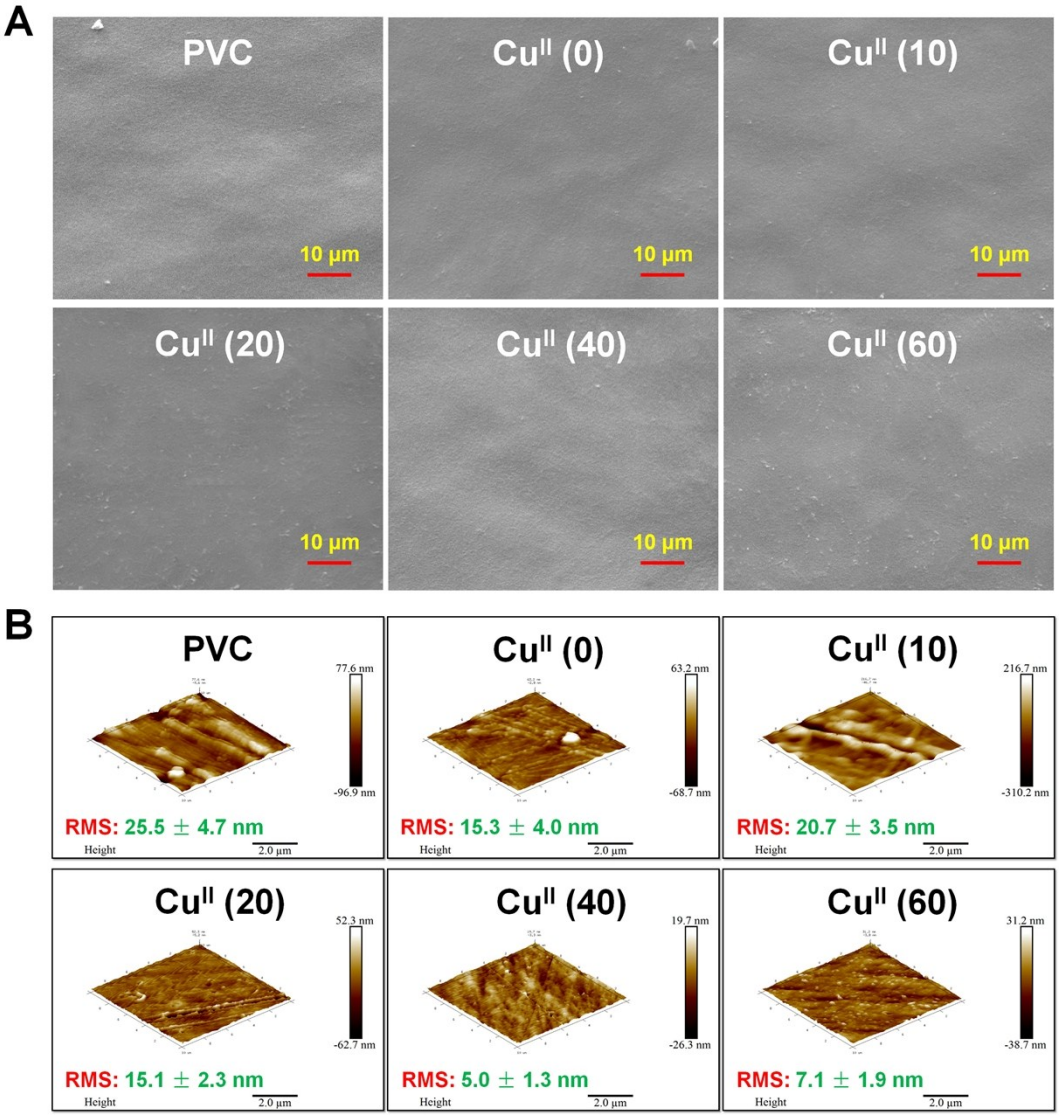

Fig. S1. SEM (A) and AFM (B) of the PVC before and after modification via Cu^{II}-GA coatings.

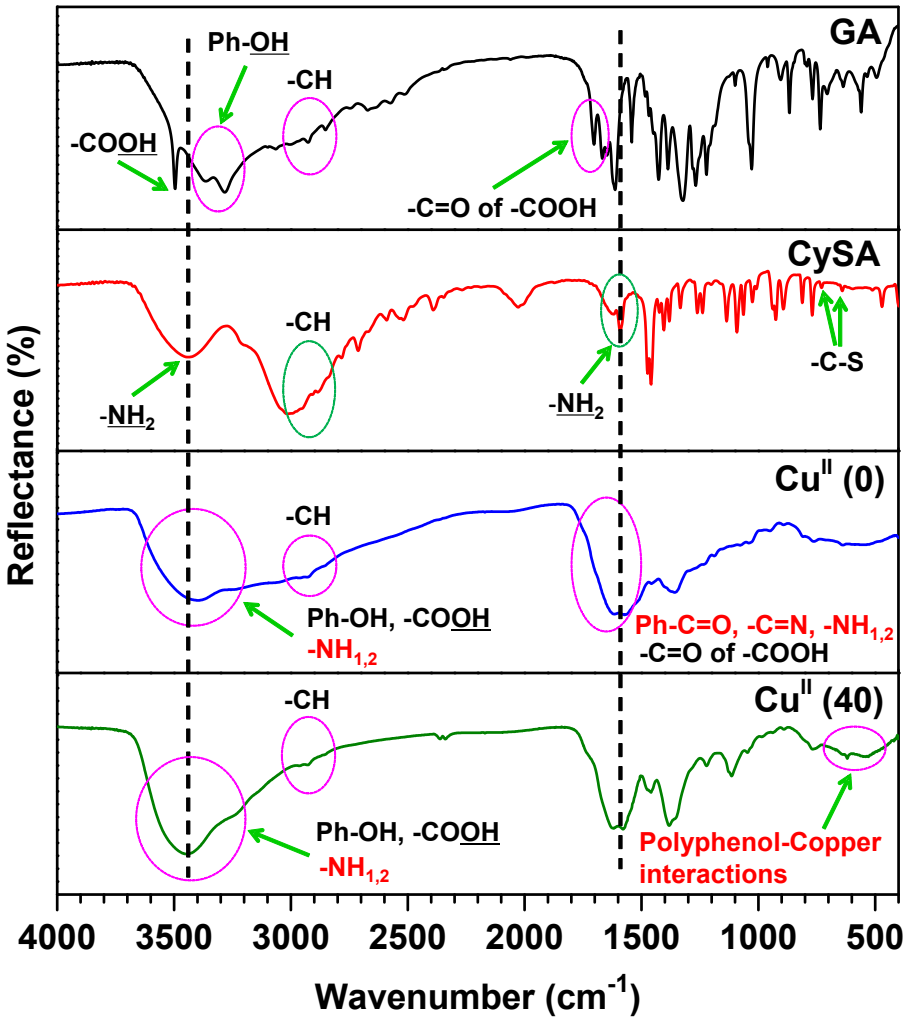

Fig. S2. IR spectra of GA, CySA, Cu^{II}(0)-GA/CySA and Cu^{II}(40)-GA polymers.

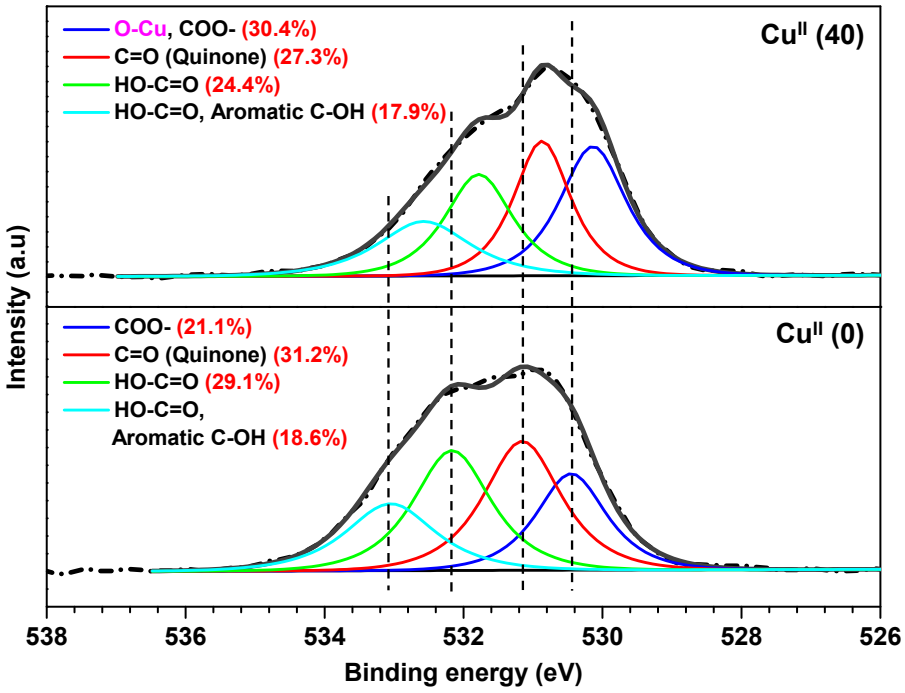

Fig. S3. High-resolution O1s spectra of $Cu^{II}(0)$ and $Cu^{II}(40)$ coatings.

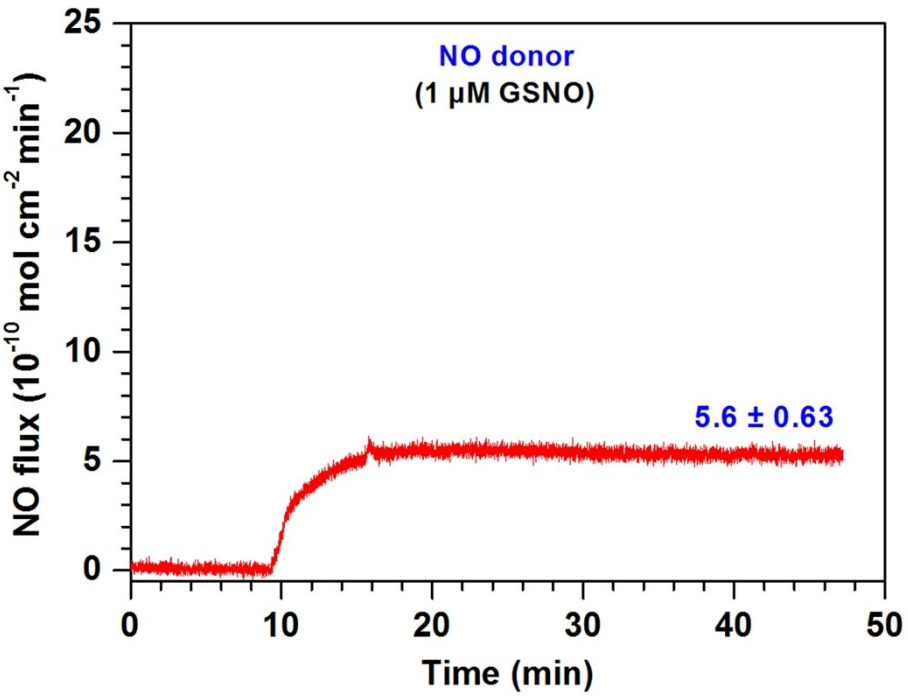

Fig. S4. Catalytic NO generation patterns induced by Cu^{II}(40) coating prepared using 40 μg/mL feed concentrations of $CuCl_2 \cdot 2H_2O$ in PBS (pH 7.4) containing NO donor consisting of 1 μM GSNO and 1 μM GSH.

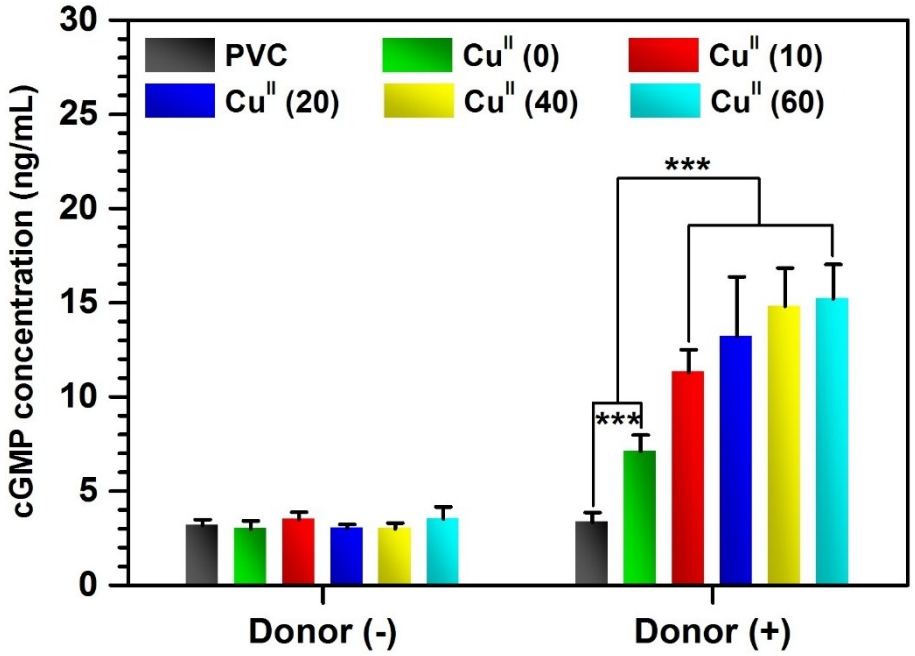

Fig. S5. The concentration of cGMP synthesized by platelets incubated with uncoated and Cu^{II}-GA/CySA coated PVC for 2 hours. Data presented as mean ± SD (n=4) and analyzed using a one–way ANOVA, ***$p < 0.001$.

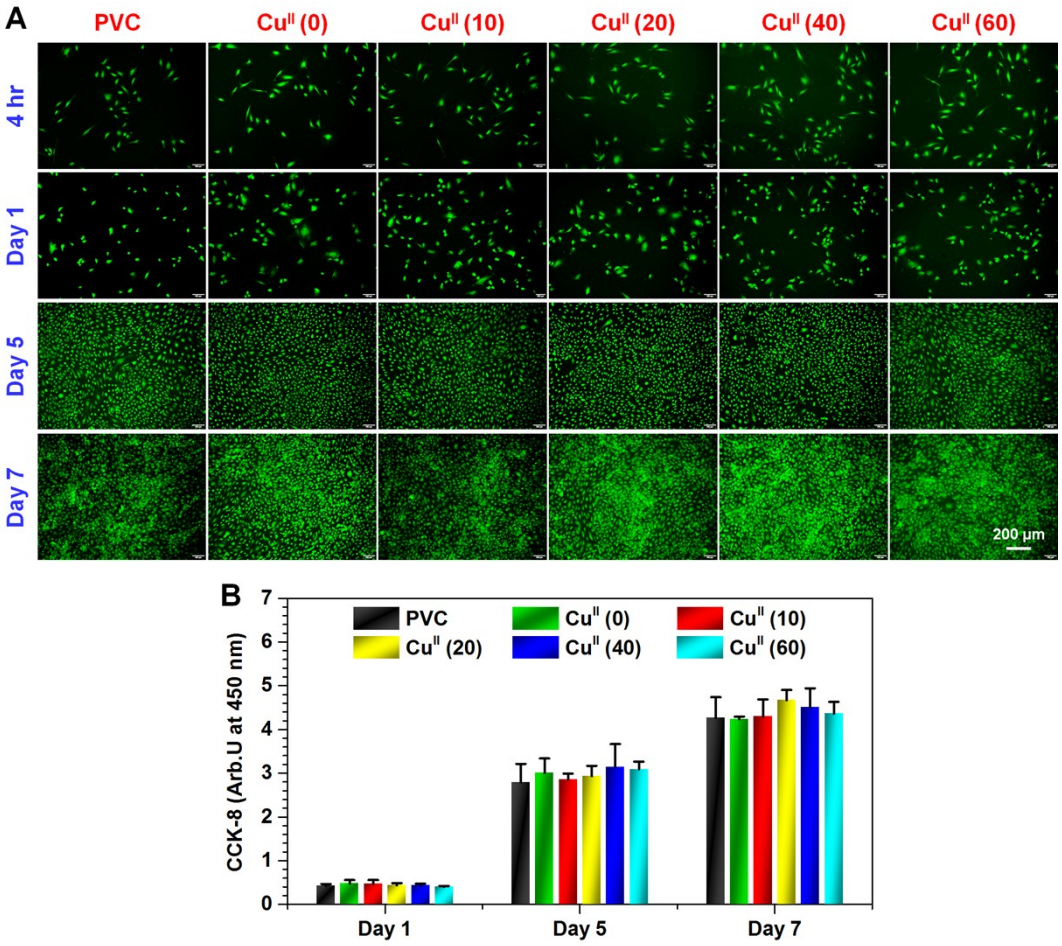

Fig. S6. (A) Fluorescence staining and (B) proliferation analysis of HUVECs cultured on the surfaces of PVC before and after modification via Cu^{II}-GA/CySA coatings after 1, 5 and 7 days of culture. Data presented as mean ± SD (n = 4).

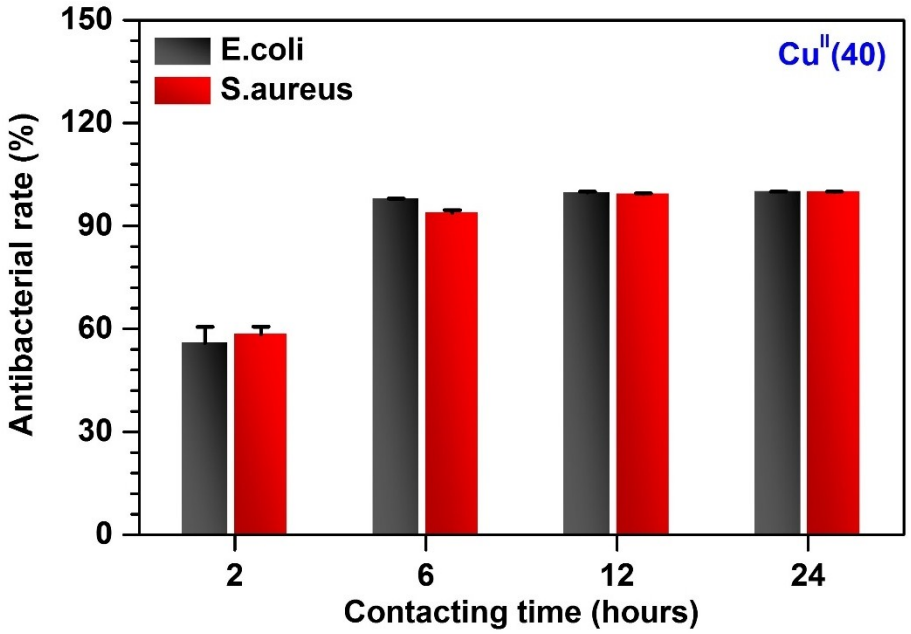

Fig. S7. Antibacterial rate of $Cu^{II}(40)$ at different contacting durations (detailed values of antibacterial rates are available in **Table S2**).

Table S1. Hemolysis ratio of the PVC before and after modification by different Cu^{II}-GA/CySA coatings.

Sample	Hemolysis ratio (%)
PVC	0.32 ± 0.08
$Cu^{II}(0)$	0.34 ± 0.22
$Cu^{II}(10)$	0.27 ± 0.09
$Cu^{II}(20)$	0.54 ± 0.17
$Cu^{II}(40)$	0.72 ± 0.41
$Cu^{II}(60)$	0.36 ± 0.13

Table S2. Antibacterial rate of Cu^{II}(40) at different contacting durations (%).

	2 h	6 h	12 h	24 h
E.coli	55.87	97.83	99.75	>99.99
S.aureus	58.43	93.82	99.29	99.88