Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Biocatalytic nitric oxide generating hydrogels with enhanced anti-inflammatory, cell migration, and angiogenic capabilities for wound healing applications

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Materials and Methods.

Adhesive and tensile strength of hydrogel

The adhesive strength of GH and GH/Cu hydrogels was measured by a universal test machine (UTM, Instron 3343, Instron, USA), according to the modified ASTM method F2255-05 ("Standard Test Method for Strength Properties of Tissue Adhesives in Lap-Shear by Tension Loading") using the de-cellularized poricine skins (obtained from HANS biomed). First, the skin was cut into a 10 x 25 mm rectangle and soake in PBS solution (0.1 M, pH 7.4) for 30 min. Then, the substrates were dried and attached to a polyvinyl chloride (PVC) substrate (60 x 25 mm) by ethyl cyanoacrylate glues. On one substrate of porcine skin, 100 μL of either GH or GH/Cu hydrogels was applied, and then immediately covered with another specimen. The overlapped specimens were applied with a weight of 100 N for 10 min at room temperature. The adhesive strength was recorded as the bonded skins were completely separated at a crosshead speed of 10 mm/min with a 100-N load cell. Fibrin glue was used as control under the same conditions

Next, we measured the tensile strength by preparing 800 μL of hydrogels in square-shaped Teflon mold (10 x 30 x 2 mm). The hydrogels were incubated in PBS solution (0.1 M, pH 7.4) in 2 d for equilibrium. Then, the dimensions (width and height) of swollen hydrogels were measured individually with a caliper. The tensile strength was evaluated by using a universal testing machine (Instron 3343, Instron, USA; UTM) equipped with a 100 N load cell a rate of 10 mm/min. The failure point of tensile strength tests was determined when the slope of the stress-strain curve dropped or started to decrease. The tensile strength was calculated by dividing the maximum load at rupture by the cross-sectioned area of the samples.

Morphology and size of Cu NPs

The morphology and size of Cu NPs were carried out by transmission electron microscopy (TEM) (Tecnai G2 F30 S – Twin, FEI). Briefly, the completely crosslinked GH/Cu hydrogels were immersed in DIW at 37 ^{o}C with mild shaking at 300 rpm for 12 h. Afterwards, the supernatant was collected and dropped onto a carbon-film copper grid for TEM imaging.

Supplementary Figures

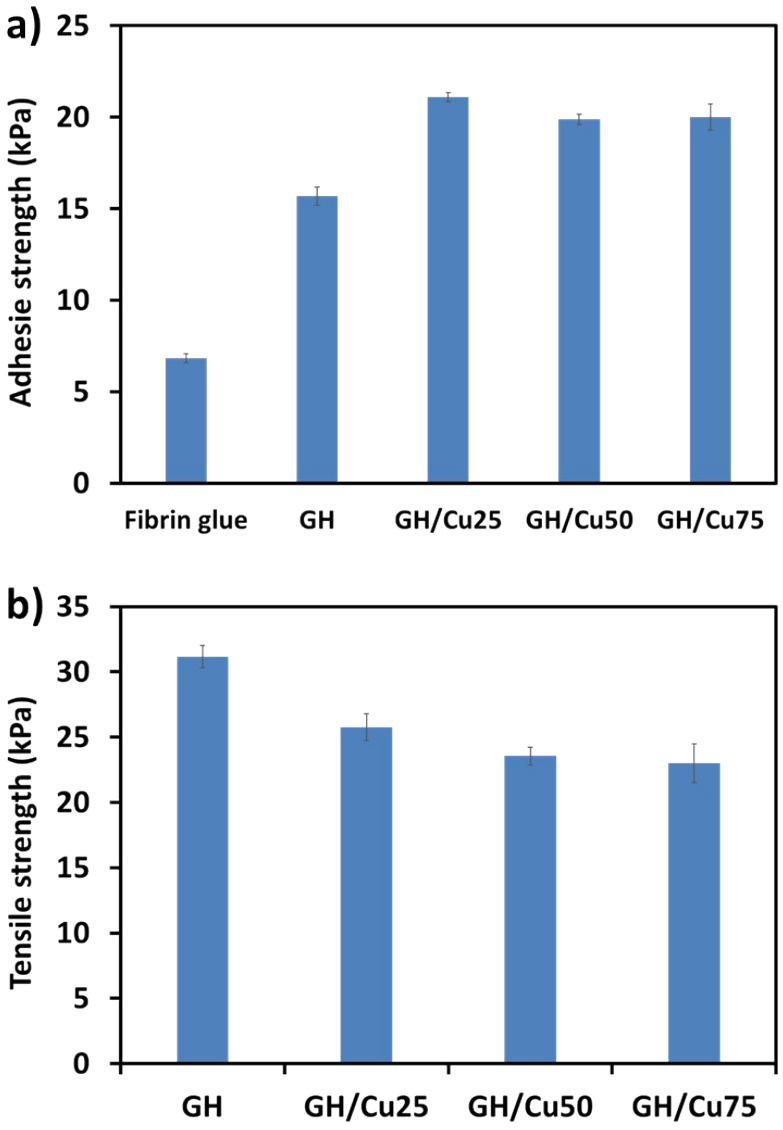

Figure S1. The adhesive strength (a) and tensile strength (b) of GH/Cu hydrogels

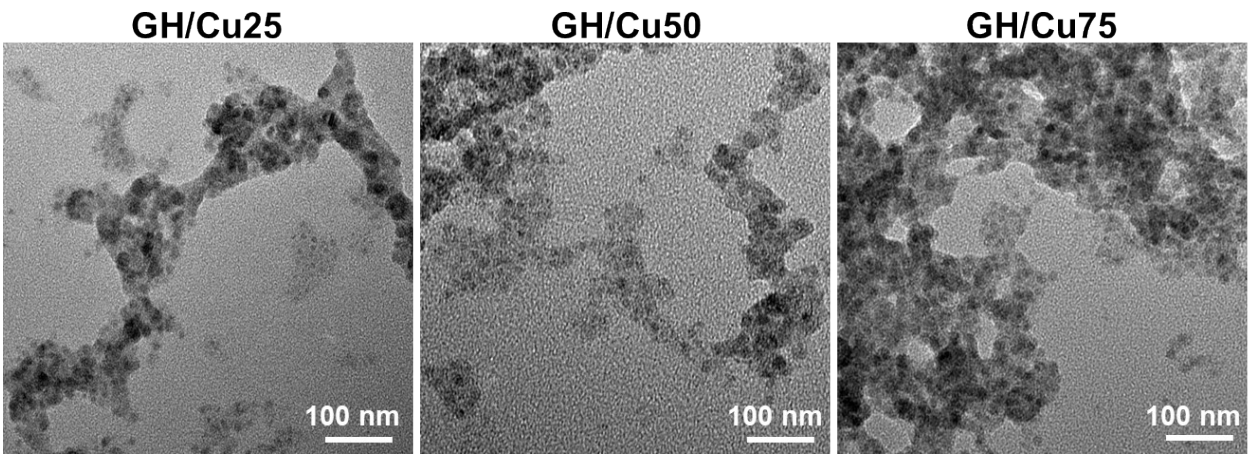

Figure S2. TEM images of Cu NPs released from GH/Cu hydrogels