Supplemental Material

Figure S1

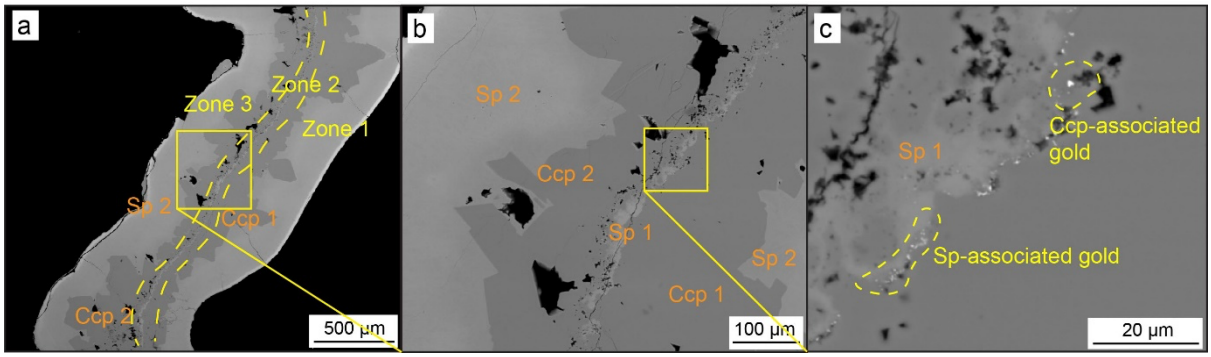

Fig. S1 Part of the conduit wall of a chimney sample (sample ID: 134259A) from Rogers Ruins hydrothermal venting field. The bi-directional grown chalcopyrite (Ccp1 and Ccp2) is bounded by a sphalerite (Sp 2)-dominated layer, all of which are overgrown by late-stage sphalerite (Sp 1). Native gold is observed on the contacts of Sp 2 and Ccp, which corresponds to the Sp and Ccp-associated gold in the main text.

Figure S2

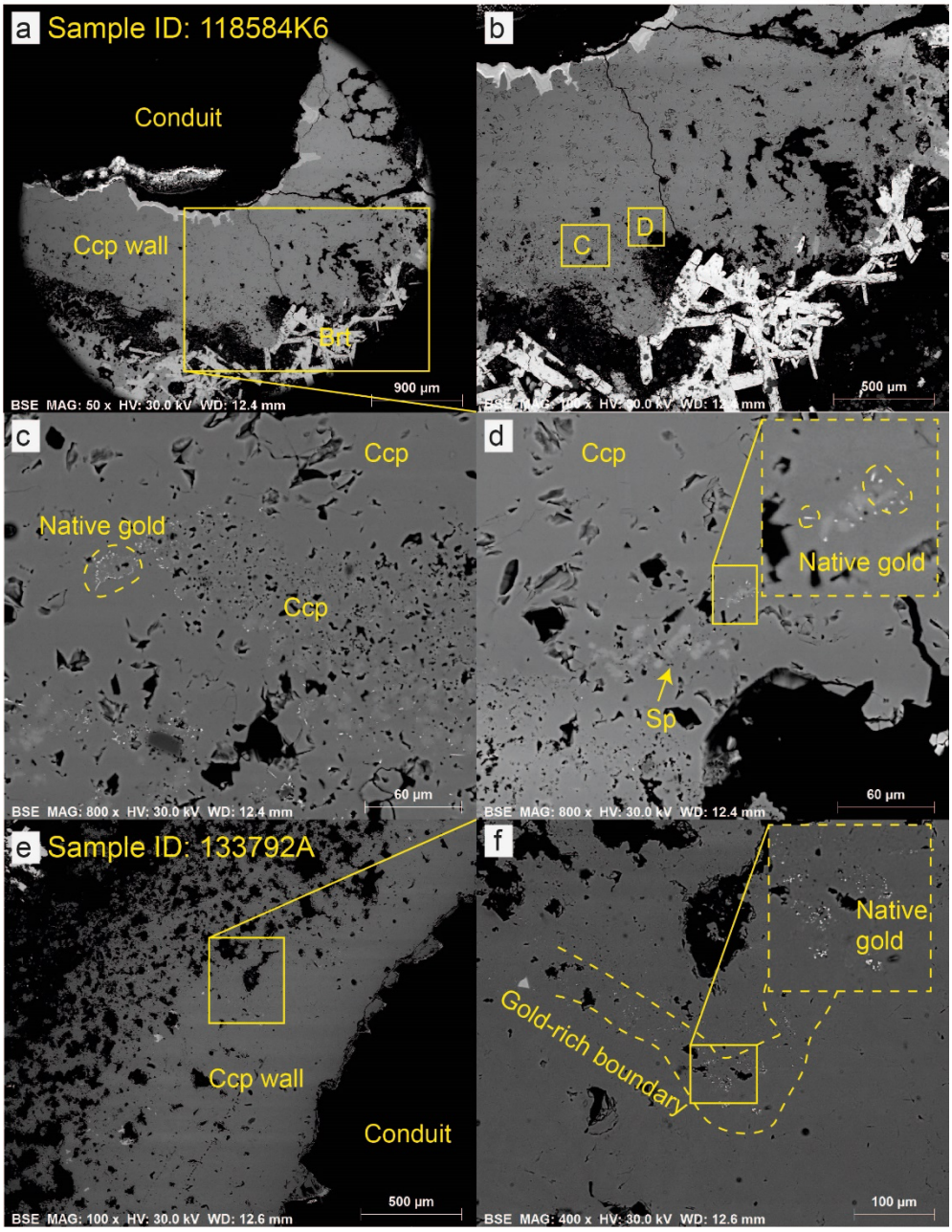

Fig. S2 (a-d) The conduit wall from another region of the studied chimney sample (sample ID: 118584K6) from Satanic Mills hydrothermal venting field. On the outer part of the wall, native gold is closely associated with sphalerite and fine-grained chalcopyrite, which corresponds to the Sp-associated gold and Ccp-associated gold in the main text. (e, f) Part of the conduit wall of a chimney sample (sample ID: 133792A) from Suzette hydrothermal venting field (Susu Knolls). The gold-rich boundary is located at the outer part of the chalcopyrite wall, which corresponds to the Ccp-associated gold in the main text.

Figure S3

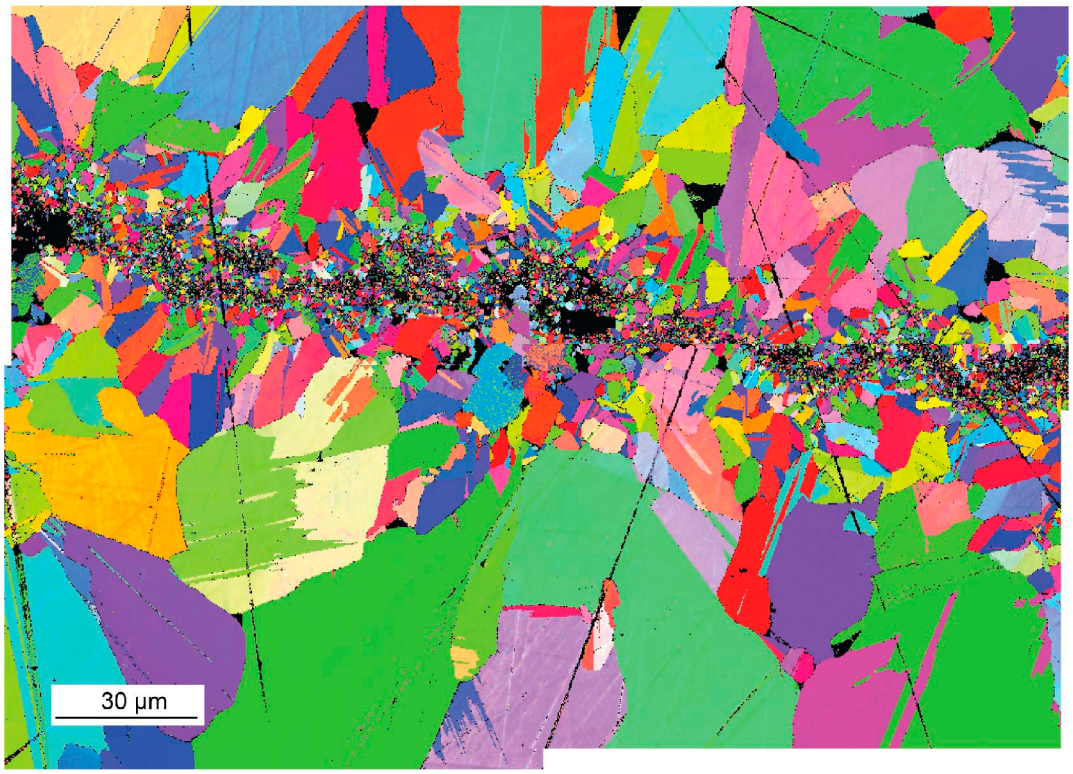

Fig. S3 The inverse pole figure map (IPF_Z) of crystal orientations for all the sulfides in region 1 (same area of Figure 6). Those crystals show various colors, which means that those crystals do not have preferred orientations during the growth. The inverse pole figures of X and Y directions show the similar features. The legend is same to that of the IPF_Z map in Figure 9.

Figure S4

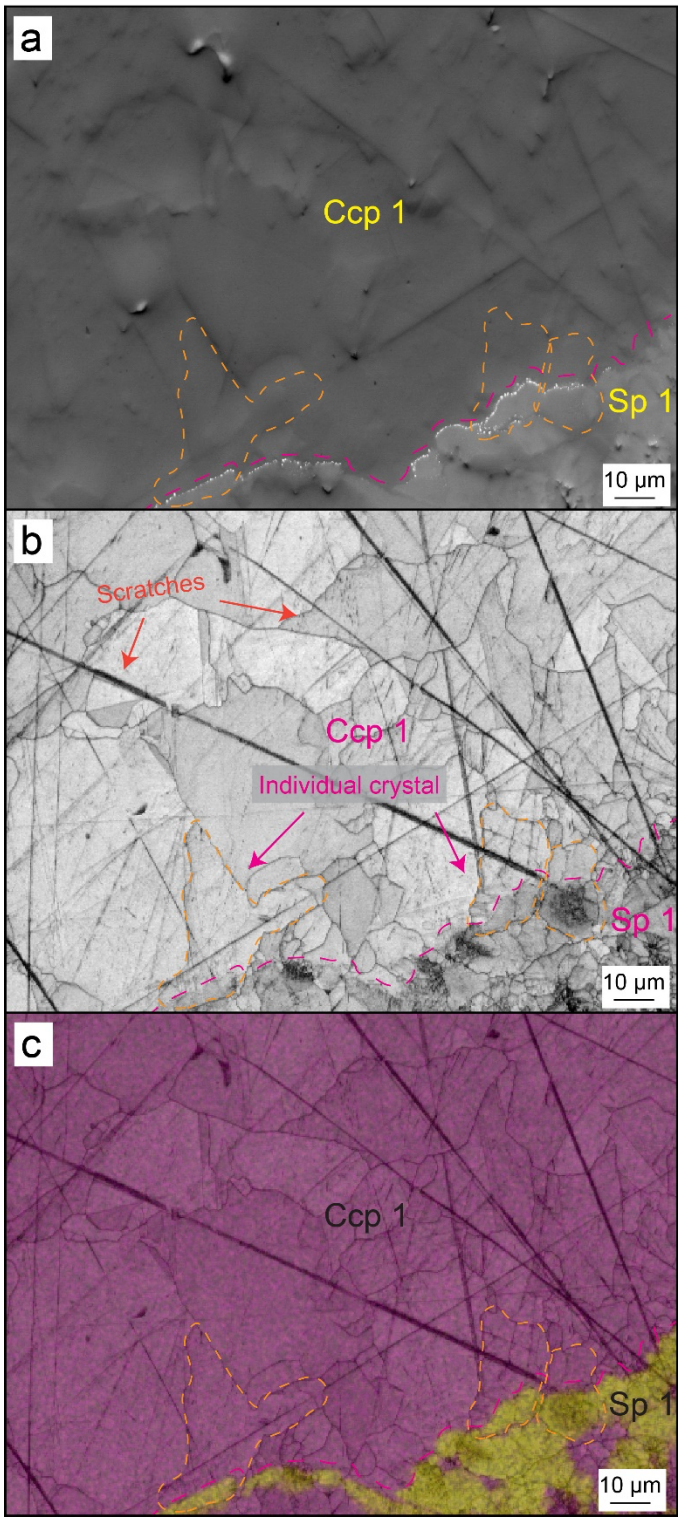

Fig. S4 The gold chain occurs delineating the boundary of sphalerite and chalcopyrite, indicated by pink dashed lines. (A) BSE image; (B) EBSD pattern quality map; (C) Cu (pink) and Zn (yellow) distribution overlying pattern quality map. The individual crystal boundaries are indicated by orange dashed lines.