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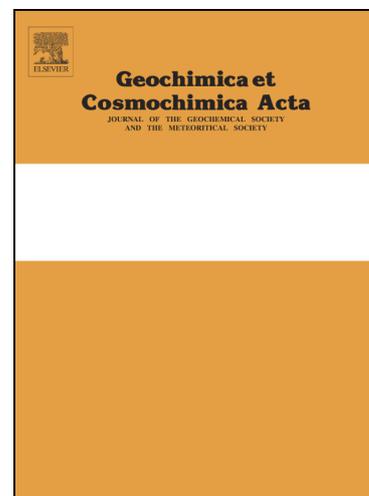
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**Small changes in Cu redox state and speciation generate large isotope fractionation during adsorption and incorporation of Cu by a phototrophic biofilm**

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**Highlights:**

- Cu adsorption onto phototrophic biofilm induces enrichment of biomass in heavy isotope.
- Heavy isotope is favored by Cu complexation with exopolymeric substances.
- Light isotope is favored by Cu reduction inside the biofilm.

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