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Surface chemical reactions induced on pyrite by ion bombardment

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Highlights

- We present results about the reduction process of natural single crystal pyrite under 4.5 keV helium ions.
- We found that energetic He^+ - pyrite interaction disrupts the ionic environment producing ions S_2^{-2} and S detached from Fe^{2+} , as well as Fe^{3+} and Fe^0 .
- The pyrite matrix does not passivate the embedded iron structures that are readily oxidized to a magnetite like (from the XPS point of view) iron oxide.
- The reduction mechanism induced by He^+ bombardment has proven to be active to reduce the magnetite back to iron.

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