

## Two kinds of authigenic xenotime overgrowths in response to an Early Paleozoic tectonothermal event in South China

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This study has documented two kinds of xenotime overgrowths from the Cryogenian-Ediacaran sedimentary rocks in South China. The identical tetragonal dipyramidal structures prompted one type of xenotime to overgrow detrital zircon grains, whereas the other type coexists with rutile crystals. SIMS Pb-Pb, NanoSIMS, EPMA, and TEM imaging analyses suggest these xenotime overgrowths, together with their rutile substrate could be of hydrothermal origin; formed by means of percolating fluids leaching ilmenite and REE(Y) bearing silicate minerals. Iron, Ti, and REE(Y) ions leached in this way were combined with O, S, and P anions to precipitate rutile, xenotime, iron oxides, and pyrite in other pore spaces. Such fluid induced activities were probably induced by the ca. 460–390 Ma Wuyi-Yunkai Orogeny in South China. The most important finding is that the rutile-xenotime assemblage was precipitated almost simultaneously, rendering a dissolution-reprecipitation process impossible. Absence of dissolution margins on detrital zircons suggest detrital Fe-Ti oxides are more prone to be leached by fluids than zircon grains, probably because the latter has more stable chemical properties.