

Interactive comment on “Uranium incorporation in fluorite and exploration of U-Pb dating” by Louise Lenoir et al.

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This manuscript ‘Uranium incorporation in fluorite and exploration of U-Pb dating’ by Lenoir et al. is well written and very thoughtful. This is precisely the type of work that needs to be published to establish the potential and complexity of dating any mineral. Fluorite is an extremely important mineral because it is fairly common in ores. Many studies could have overlooked the tiny layer of favorable fluorite. The petrographic and synchrotron work really set this study apart. Bravo! My only comment is about the U oxidation state which is assumed to be reduced because of the relationship of the fluorite overgrowth that has elevated U with pyrite. While I made a similar assumption myself with rhizolith calcite associated with U (Rasbury et al., 2000), we later measured the oxidation state of U and it is oxidized (Kelly et al., 2007). There is a statement on

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line 353 about the hexavalent incorporation of uranium in fluorite from Round Top. This sentence is not complete and while it is true that the fluorite at Round Top has oxidized U, this has not been published. We have actually examined a number of fluorite samples from a variety of types of ore deposits and every example, whether associated with sulfides or not has hexavalent U. I don't find the authors model or explanation a sticking point for publication as our results are not published, but I can almost guarantee that it is wrong. Mainly though, this sentence should be removed, completed, and if it stays there should be some reference like Rasbury pers comm (Did you hear it from me or Gavin Piccione?).

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