|  |  |
| --- | --- |
| Reviewer's comments | Authors' edits and comments |
| Reviewer 1: The dissociation temperature of (U0,8,Pu0,2)N is proposed at 1900°C whereas it's evaluated at 1600°C in previous studies (Matzke, Hayes, ....), can you explain?  During irradiation metallic-Pu were found on the clad in some experiences.  Thank you for this very complete paper. | Thank you very much for your feedback.  The article presents experimental data on the thermal analysis of uranium nitride and mixed nitride fuel in the temperature range up to 1900 ℃. We do not write that decomposition begins at 1900 ℃, this is just the maximum temperature of the experiments. The article deals with the processes of decomposition and formation of higher uranium nitrides in the fuel based on UN and UPuN. We do not touch upon the topic of decomposition of uranium or plutonium mononitrides by reaction in this paper. |
| Reviewer 2: The paper presents a thermal stability experiment for uranium nitride (UN) and mixed uranium-plutonium nitride (MNIT) using thermogravimetric method. Although the experiment itself is straightforward, the target materials (UN and MNIT) are of interest to the nuclear fuel community, where there are limited open experimental data for these fuel materials (particularly for mixed uranium-plutonium nitride). The experiments were well controlled. The dynamic weight gain/loss behaviors for the fuel materials were recorded and reasonable explanations were given. Microstructural analysis is missing in the paper. The conclusions were well supported by the experiments and the analyses. In general, the paper quality is acceptable for the conference.  Some minor issues in the paper:  • First sentence in the section 2.1 should be deleted.  • Some acronyms (e.g. ICP) and terms (e.g. plasma "Prodigy".) need to be defined/clarified. | Thank you very much for your feedback.  The first sentence has been removed. All of the abbreviations deciphered.  "Prodigy" is the name of the spectrometer.  ICP - inductively coupled plasma |
| Reviewer 3: Overall the paper is well written and concise.  This reviewer has the following comments for the authors to consider  1. In Figure 1, there are two mass loss events prior to hitting max temperature. It is stated the loss is due to conversion of the sesquinitride to mononitride. Could one of these events be the conversion of UN2 to UN? | Thank you very much for your feedback.  1) The decomposition temperature of UN2-x is lower than that of uranium sesquinitride. The decomposition reaction UN2 proceeds at a temperature below 675 ℃. Therefore, what we observe in the figure cannot be associated with the decomposition of uranium dinitride. In the synthesis of nitride fuel, the formation of uranium dinitride also seems unlikely. |
| 2. How does Pu stabilize UN against forming higher nitrides? | 2) There is no confirmed theory on the mechanism of stabilization of the mononitride phase when plutonium nitride is added to uranium nitride. Conclusions are made only on the basis of experimental data. It is necessary to conduct a series of experiments on nitriding MNIT fuel with different plutonium content, followed by X-ray diffraction analysis of samples to explain the mechanisms of phase state stabilization. |
| 3. Section 2.1 is formatted differently from the rest of the document, and has the format directions (Times New Roman 10 pt, etc.) as the first sentence. Please delete. | 3) Thank you very much for your feedback.  Сorrected |