

SAND Paper:

Overall Comment:

Thank you very much for your contribution on this important and up to date topic. I would like to emphasize certain points before going into details.

It is general scientific standard to write in an unbiased manner. I don't see this taken into consideration in your paper. You are of course allowed to have an opinion, but is neither standard not polite to use words like "frequently, unprecedented, famous" etc. You are trying to use sources that fit well your purpose and do not take scientific standards to check both sides of your statement. Try to quantify your statements with numbers, try to use volumes /waste volumes or TRL or any other quantifiable number to strengthen your statements.

The manuscript refers at several places to the authors' previous work. While self-citation is appropriate where directly relevant, I would encourage the authors to review whether all of these references are necessary and to ensure that the discussion adequately reflects the broader literature in the field. In particular, some claims may benefit from support through independent sources in addition to the authors' own publications.

In addition, I would like to challenge the chapter 3, current state of development: I think it would be very beneficial to the work to take a more structured approach to this chapter, and value the whole chapter on the TRL, that is introduced in the first sentence. Otherwise it remains an relative comparison, and does not reflect any proven numbers. The author could distinguish between fundamental technological stagnation and incremental engineering advances. The author could also work on the point which of the systems would be able to achieve market readiness instead of stating that the concepts are repetitive.

There is no clear separation between demonstrated laboratory efficiency and industrial scale ton – tonnage throughput reliability.

The author shows a strong opinion that none of the systems has been realized so far – please reduce the statement in the paper to a reasonable amount.

Scientific comments:

The title has a random capital letter/non capital letter choice.

15: the US has a DGR in place that is operational.

45 space missing between p. and 284

60 no ":" After et

65: this paragraph does not address the history of ADS, but tries to prove a point the author would like to stress – this can go into the analysis/summary section but not in the description.

85: Please check again your argument regarding the minor actinides: Is there an input from the reduction of minor actinides and long lived fission products? Can you quantify this? Perhaps on parameters like total decay heat generation rate or the chemical stability over time.

Text in Fig. 2 – delete last sentence, does not give any additional information.

115: I strongly question this statement: I know Chinese information is hard to get, but the research in Japan and China is strong. CIADS and the Japanese research line are examples.

128 – 130: this paragraph is unclear and needs to be rewritten.

135 – the proliferation question is coming out of the blue and is out of context of the paper. I suggest to remove this.

Also here, you jump from ADS to reprocessing – why are you not addressing it as reprocessing. Why is it connected to ADS? Or is it again just a point you would like to emphasize to explain your disagreement with the system?

170: Buongiorno is only addressing US plant, and is not talking globally.

176: You are jumping now from an ADS system to a GEN IV system – also here I am missing the context.

205 – this is well known information, and it can be shortened.

206 misspelling of “Technetium”

215 – I am missing a source for this statement.

220 ff: Your statement poses an oversimplification regarding the major component of Sr-90 recovery from reprocessing. While the market potential is cited (e.g., Intel Market Research, 24chemicalResearch), this conclusion relies heavily on highly volatile and speculative future market absorption rates. The author fails to adequately model the risk associated with geopolitical supply disruptions or fluctuations in global medical/industrial demand for these niche isotopes.

260 – 265: The conclusion that the revenue from isotope production is "economically negligible at the facility scale" (Page 9, lines 260-265) while simultaneously highlighting Sr – 90 as a major component creates an internal contradiction.