

Development of density control technologies for MOX pellet using dry recycled powders

Thursday 21 April 2022 13:40 (2 hours)

Technology to utilize a dry recycled MOX powder has been developed as a part of MOX fabrication technology development for fast reactors. The purpose of this study is to develop a technology to control the density of MOX pellets with use of dry recycled MOX powder. A roll crusher and a jet mill were employed to prepare the recycled MOX powder which had three kinds of particle sizes (coarse, medium and fine). Sintering tests of MOX pellets were carried out as parameters of particle size and addition rate of dry recycled powder. The results are summarized as follows.

- For the coarse and medium dry recycled powders, a decrease in density due to addition was confirmed, but for the fine dry recycled powders, almost no decrease in density due to addition was confirmed. From this, it is considered that the fine dry recycled powder can be used in the same manner as the raw material powder such as the raw MOX powder as long as the addition rate is up to about 40 wt %.
- When dry recycled powder (coarse or medium) and pore former were added at the same time, a synergistic effect was produced in addition to the density reduction effect of both, and the density was lower than the expected density. In addition, this synergistic effect occurred within the range of this test at 10 wt% of coarse dry recycled powder + 2 wt% of pore former, or 15 wt% of medium dry recycled powder + 2 wt% of pore former. Further, it is considered that this synergistic effect can be alleviated by adding fine dry recycled powder.
- It is considered that the addition of coarse and medium dry recycled powder can delay the progress of sintering by adding it together with the pore former, and the influence can be suppressed by adding fine dry recycled powder.
- High dry recycled powder addition caused cracks in the pellets, but addition of 2% by weight of pore formers no longer observed cracks.

Country/Int. organization

Japan

Author: NISHINA, Masahiro

Co-authors: Mr TAKEUCHI, Kentaro; Mr MURAKAMI, Shin-ichi

Presenter: NISHINA, Masahiro

Session Classification: Poster Session

Track Classification: Track 3. Fuels, Fuel Cycles and Waste Management