

Requirement and Choice of Core Materials

K.S. Rajan

Professor, School of Chemical & Biotechnology

SASTRA University

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1 Quiz

1.1 Questions

1. The thermal efficiency of the PFBR is set as 40 % with the thermal power of 1250 MW. Determine the reactor electrical power and the waste heat.
2. Which of the following is not a desirable property of nuclear fuel?
(a) high thermal conductivity (b) high melting point
(c) compatibility with coolant (d) high vapor pressure
3. Which of the following is never considered as fuel in nuclear reactors?
(a) metals (b) metal carbides (c) metal oxides (d) metal chlorides
4. Which among the following category of nuclear materials has the highest thermal conductivity?
(a) metals (b) metal carbides (c) metal oxides (d) metal nitrides
5. Which among the following category of nuclear materials has the highest breeding potential?
(a) metals (b) metal carbides (c) metal oxides (d) metal nitrides
6. Metal oxide fuel are preferred as nuclear fuel due to
(a) high thermal conductivity and low breeding potential
(b) high thermal conductivity and low breeding potential
(c) low degree of swelling
(d) high degree of swelling
7. Why was UC-PuC used as fuel in FBTR?
(a) to achieve better breeding ratio
(b) to produce fuel with higher degree of enrichment
(c) to produce fuel with lower degree of enrichment
(d) unavailability of metallic fuel
8. Name the gas that is released due to neutron absorption in boron carbide.

1.2 Answers

1. Efficiency = Electrical power*100/thermal power = 40 %

Therefore, electrical power = efficiency * thermal power = 40*1250/100 = 500 MW

Waste heat = Electrical power – Thermal power = 1250-500 = 750 MW

2. (d) high vapor pressure

3. (d) metal chlorides

4. (a) metals

5. (a) metals

6. (c) low degree of swelling

7. (b) to produce fuel with higher degree of enrichment

8. Helium