

Deuterium retention and melting behavior in Toughened, Fine-Grained Recrystallized Tungsten

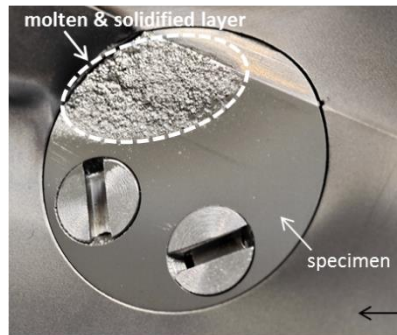
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Background & Purpose

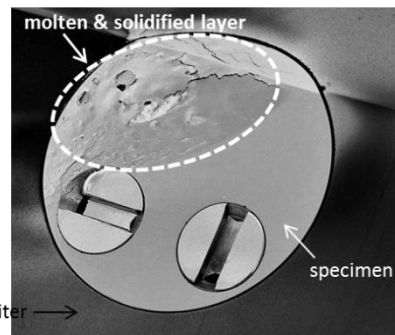
- TFGR-W was newly developed W materials and showed improved ductility.
- In this study, the hydrogen isotope irradiation effects were investigated, in order to qualify TFGR-W for the use for future fusion reactors.

Melting behavior

(a) W-TiC

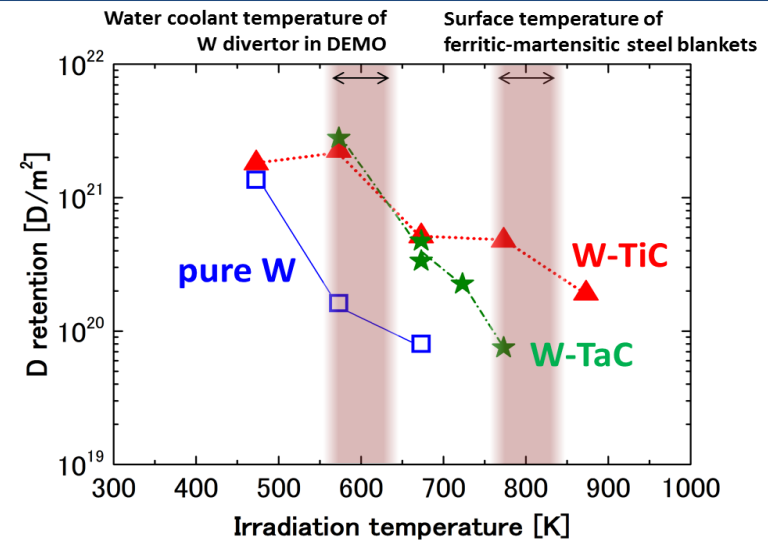


(b) W-TaC



- In order to avoid significant roughening and cracking, **TFGR-W should not be used under surface melting conditions.**

Deuterium retention



- At low temperature of ~600 K (close to water coolant temperature of W divertor of a recent DEMO concept), **D retention in TFGR-W could be greatly higher than that in pure W.**
- At high temperature of ~800 K (surface temperature of ferritic-martensitic steel blankets), **TFGR-W with TaC dispersoids should be used for reduced retention.**