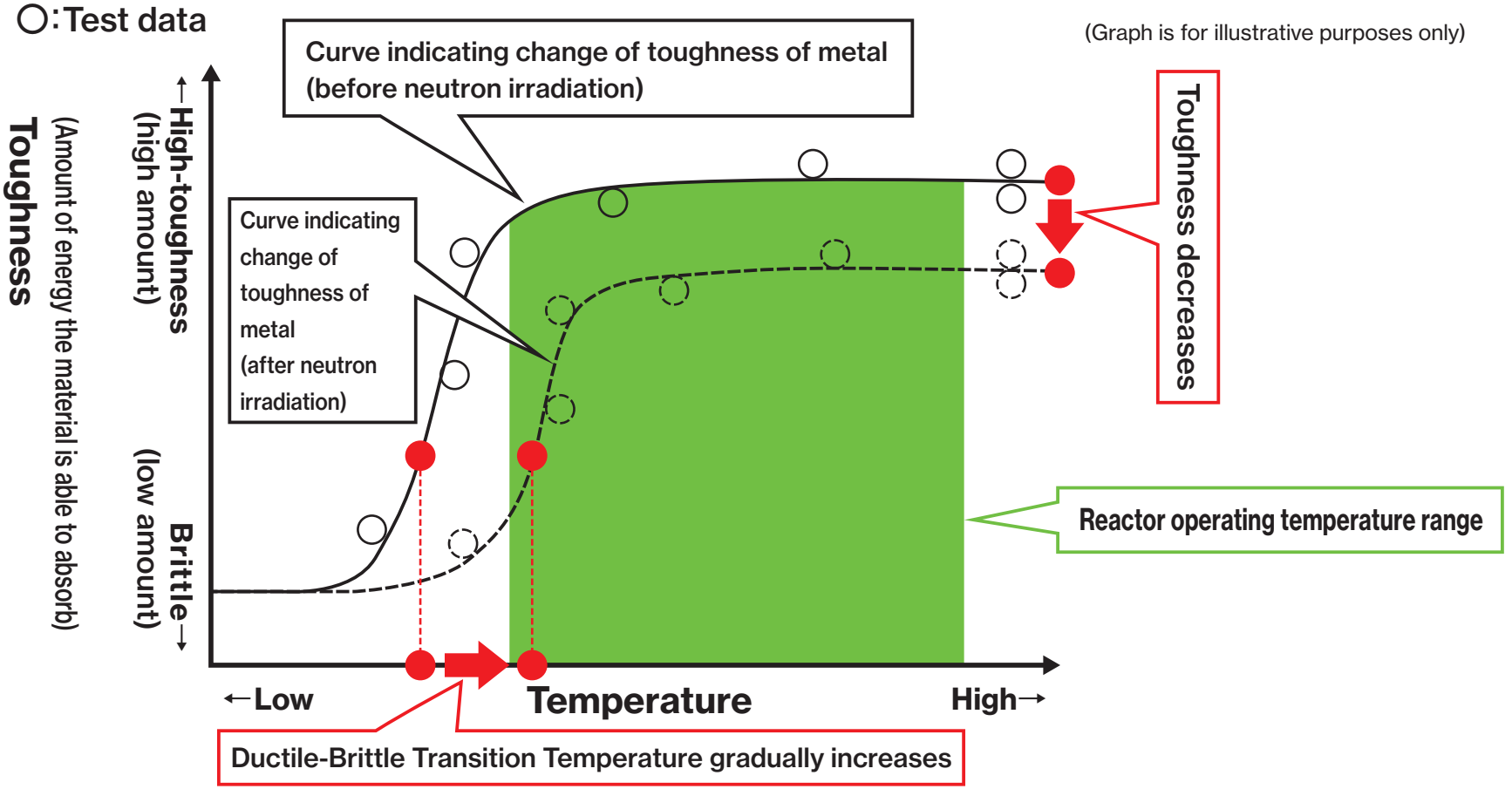
About Ductile-Brittle Transition Temperature

If a metal has low toughness, when stress is applied to a large crack, it will break. Additionally, if it becomes below a certain temperature, its toughness decreases, and the temperature at which the toughness changes is called the “Ductile-Brittle Transition Temperature” (DBTT). The steel used to make reactor vessels often has a DBTT that is extremely low at first (tens of degrees below 0°C), but after a long period of operation, it can climb as high as tens of degrees above 0°C due to continued irradiation with neutrons. If there is a large crack in the reactor vessel within this temperature range and a very large stress is applied, there is a possibility of it being unable to withstand the stress. That’s why it’s necessary to check for changes in the DBTT, ensure there are no large cracks, and be cautious of stress when operating the reactor at low temperatures.



Source: Produced based on materials from the Atomic Energy Association (ATENA)