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Fatigue Performance of Proton Irradiated Ti6Al4V Alloy

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Titanium alloy Ti6Al4V currently used in beam windows in accelerator facilities are subjected to thermal stresses and high cycle fatigue loading due to intense pulsed proton beam. These materials interacting with beam will also undergo various radiation damage which will affect their endurance limit. Till now there is no fatigue data available for high energy proton irradiated titanium alloy. In this study we carried out fatigue test on proton irradiated Ti6Al4V using a custom-made fatigue tester. The samples are irradiated with 180 MeV proton beam at Brookhaven National Lab to receive upto 0.25 DPA. Two different grades of Titanium alloy, Grade 5 and Grade 23, with different levels beta-phases are fatigue tested and compared with unirradiated samples.

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