

Nanostructure Evolution as Cause and Effect of Self-Recovering Section of RPV Steel Radiation Embrittlement

Evgenii Krasikov*

National Research Centre “Kurchatov Institute”, Moscow, Russia

***Corresponding author:** Evgenii Krasikov, National Research Centre “Kurchatov Institute”, Moscow, Russia, Email: physicsastronomy@tradescience.org

Received date: September 15 ,2021; **Accepted date:** September 20 ,2021; **Published date:** September 30,2021

Introduction

Influence of neutron irradiation on Reactor Pressure Vessel (RPV) steel degradation are examined with reference to the possible reasons of the substantial experimental data scatter and furthermore-nonstandard (non-monotonic) and oscillatory embrittlement behavior. In our glance this phenomenon may be explained by nanostructure evolution of steel during irradiation that result in presence of the wavelike recovering component in the embrittlement kinetics.

We suppose that the main factor affecting steel anomalous embrittlement is fast neutron intensity (dose rate or flux), flux effect manifestation depends on state-of-the-art fluence level. At low fluencies radiation degradation has to exceed normative value, then approaches to normative meaning and finally became sub normative.

In our opinion controversy in the estimation on neutron flux on radiation degradation impact may be explained by presence of the wavelike component in the embrittlement kinetics. Therefore, flux effect manifestation depends on fluence level. Owing to nanostructure evolution at low fluencies radiation degradation has to exceed normative value, then approaches to normative meaning and finally became sub normative. Paradoxically as a result of dose rate effect manifestation peripheral RPV's zones in some range of fluencies have to be damaged to a large extent than situated closely to core. We suppose that at some stages of irradiation damaged metal have to be partially restored by irradiation i.e. neutron bombardment. Nascent during irradiation nanostructure undergo occurring once or periodically evolution in a direction both degradation and recovery of the initial properties. According to our hypothesis at some stage(s) of metal nanostructure degradation neutron bombardment became recovering factor.

Biography

Education: Moscow Power Engineering Institute. Degree(s) or Diploma(s) obtained: Master's Degree in Material Science-1970, Ph.D.-1974, D.Sc. -2005. Membership of professional bodies: member of Scientific Council of RAS on Radiation Damage Physics of Solids. Years within the firm: since 1974. Key qualification: responsible executor in Radiation Damage Physics of Solids. Professional experience record: since 1974 till now, Moscow, National Research Centre "Kurchatov Institute", Department: Reactor Materials and Technologies Institute.



Citation: Evgenii Krasikov, Nanostructure Evolution as Cause and Effect of Self-Recovering Section of RPV Steel Radiation Embrittlement. J Phys Astron.2021;9(8):213.

©2021 Trade Science Inc.