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J Material Sci Eng 2017, 6:1 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.059



## Resilience of the reactor pressure vessel steel at fast neutron intensity decreasing

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**Statement of the Problem:** 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-monotonous) and oscillatory embrittlement behavior. In our glance this phenomenon may be explained by presence of the wavelike 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. Data on radiation damage change including through the ex-service RPVs taking into account chemical factor, fast neutron fluence and neutron flux were obtained and analyzed.

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. At low fluencies radiation degradation has to exceed normative value, then approaches to normative meaning and finally became sub normative. As a result oscillation arise that in tern lead to enhanced data scatter.

Moreover as a hypothesis we suppose that at some stages of irradiation damaged metal have to be partially restored by irradiation i.e. neutron bombardment serve as radiation annealing of radiation embrittlement of the steel. Nascent during irradiation structure undergo occurring once or periodically transformation in a direction both degradation and recovery of the initial properties. According to our opinion at some stage(s) of metal structure degradation neutron bombardment became recovering factor that result in increase the resilience and frontier of the steel.

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## Facile synthesis of L-Cysteine CdTe core shell system and its antioxidants properties

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L-Cysteine CdTe core and CdTe/CdSe core-shell were successfully synthesized in an aqueous solution medium. The synthesized QDs were analysed using UV-vis absorption spectroscopy and florescence spectroscopy, transmission electron microscope (TEM), Fourier transform infra-red spectra (FT-IR) and X-ray powder diffraction (XRD). Systematic investigations were carried out for the determination of optimal condition namely: reaction times, pH and mole ratios. Compared to CdTe core (529nm), the core shell (601nm) demonstrate a drastic shift in wavelength to the red region proving that as extra material had been deposited unto the surface of the core. The 20, 40 and 60 days stability tests conducted proved that core-shell nanoparticles were quite stable compared to the core material. Investigation was also conducted on the total anti-oxidant capacity (TAC) and lipid peroxidation with the use of six (8) Swiss albino mice and this was done using ferric reducing antioxidant power (FRAP) and TBARS was used to malondi-aldehyde (MDA) concentration. It was discovered that the core-shell demonstrated a poor anti-oxidant property at the heart, spleen, kidney, and brain except at the liver where good anti-oxidant property was demonstrated after 24 and 72 hours of exposure. The result at the testis was not significant as against the control. Since this reaction did not involve the use of a nitrogen atmosphere nor special Ligand or buffer solutions, it suggests that the process could be easily operated on an industrial scale

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