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Charged Particles Emission in Fast Neutrons Processes on Mo Isotopes

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The Molybdenum nucleus, (protons numbers Z=42 and mass A= 83-115) has 33 isotopes of which 7 are natural (A=92, 94, 95, 96, 98, 100) and four isomers. The first 6 natural isotopes are stable but the nucleus with A=100 is unstable with the time of life of 7.8 ⊠ 1018 y. The isotopes with A=100 is a fission product and it is used in medicine.
Nuclear reactions induced by fast neutrons are of great interest for fundamental and applicative researches. For fundamental investigations fast neutrons reactions are a source of new data on nuclear reactions mechanism and structure of nuclei. For applications these reactions provide precise nuclear data for reactors technology (fission and fussion), processing of long live nuclear waste, reprocessing of U and Th for transmutation and energy projects, accelerated driven systems (ADS) etc. Fast neutrons cross sections data for charged particles emission are of interest also because, the accumulation of Hydrogen and Helium in the walls and vessels of nuclear facilities lead to the modification of their physical properties.
Neutrons are neutral elementary particles and therefore they have high penetrability power in the matter. This property is very useful in neutrons activation analysis because it is possible to analyze large solid samples. Furthermore, the emitted gamma quanta resulted in the neutron capture process emerging from the samples can be also registered. Instrumental Neutron Activation Analysis (INAA) performed with slow neutrons is a powerful tool for elemental analysis. Complemantary to INAA is Fast Neutrons Activation Analysis (FNAA) method which allows to obtain better gamma emitters.
The following reactions 94Mo(n,p)94Nb and 95Mo(n,np)94Nb induced by fast neutrons were analyzed. Cross sections, isomers ratios, parameters of nuclear optical potentials were also evaluated. The 94Nb isotope can be found in the radioactive wastes. This nucleus is unstable, has a very large time of life (T1/2 = 20300 y) and contributes to the low level geological activity of the environment due the buried wastes.

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