DEUTERON INTERACTION WITHIN A MICROCRACK IN A LATTICE AT ROOM TEMPERATURE

NUCLEAR REACTIONS IN SOLIDS

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The aim of this research was to analyze the reaction of deuteron fusion, catalyzed by the plasmons in lattices with a cubic structure, to varying the temperature. The probability of fusion in pure and impure palladium metal is calculated using a hypothesis that suggests a kind of chain reaction within the crystalline lattice. As a consequence of the enhanced tunneling effect due to increasing the temperature and the concentration of impurities, this chain reaction would be favored by microcracks formed in the structure as a result of lattice deformation. This paper interprets the results obtained, considering the trend of the potential that describes the effective interaction between deuterons within the metal. In effect, the coupling of plasmons and deuterons, in the presence of impurities, can not only reduce the thickness but also lower the height of the Coulomb barrier K.

fectively acting as an attractive interaction between the deuteron nuclei and thus reducing the distance at which Coulomb repulsion becomes dominant. Since this effect would be in operation even at temperatures close to room temperature, the relatively small vibrational energy can be ignored.

With this perspective, a study was made of crystalline lattices with more than ten electrons in the *d* band. The present paper concentrates on palladium because it has been observed that when subjected to thermodynamic stress, this metal yields interesting theoretical results.

The author has already suggested that the phenomenon of fusion is also conditioned by the level of impurities present in the metal,[2] correlated with the deformation of the lattice itself.

The numerical calculation, conducted on palladium as a function of the temperature, the total energy, and the concentration of impurities, allows the conclusion that the probability of fusion is in effect significantly enhanced by increasing these parameters.

The present paper discusses whether, in the three-