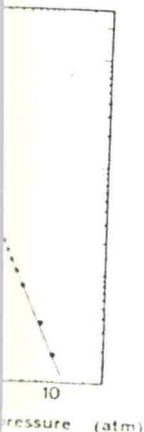


IN HELIUM

and of He₂⁺ ions is



the decay time of He⁺ radiation.

or transfer process mechanism of He⁺ at three-body and reaction processes that a two-body process must be dominant therefore He⁺ three-body destruction that results in He⁺ [5] may be observed; the overall effect but we believe that within the experimental three-body destruction rate of He⁺ is about 10⁻¹⁰ s⁻¹ at 6 × 10⁻³ Torr. The results are in good agreement with the results of [1].

pressures ranging from 1 to 41 atm, in mixtures with: N₂, O₂, CO, CO₂, NO, N₂O. The general trends are: a) the spectral distribution corresponds to vibrational bands of the molecular impurity, b) the amplitude of the light pulse is nearly independent from the impurity pressure until quenching values are reached, c) the amplitude is independent from the He pressure except for N₂ and CO mixtures, for which it is inversely proportional to this pressure, d) the decay time depends only from the partial pressure of the impurity, and is inversely proportional to this pressure (times of the order of 15 to 70 μsec at 10⁻³ Torr). At low concentrations the decay time due to impurity may be much longer than that of u.v. emission. This fact means that the energy source for impurity excitation is different from that of u.v. radiation. Are so excluded Penning effects on impurity molecules produced by He atoms in metastable states. Taking also into account that the energy expended in ionization goes mainly in He₂⁺ states, the most probable mechanism is the charge exchange: He₂⁺ + M → 2He + M⁺ + hν; where M⁺ is the molecular ion of the impurity in a vibrational excited state. This mechanism was suggested by Bennet

[3] for He-N₂ mixture at 350 Torr. The maximum energy available for transfer in He₂⁺, in its higher excited states is about 20.5 eV. A degree of vibrational excitation of He₂⁺ ions, depending on the pressure, might show up through a variation of the yield of the impurity ions, when the energy required to produce the appropriate state is near to 20 eV. This is the case of the B²Σ⁺ states in N₂⁺ and CO⁺ (18.8 and 19.7 eV respectively). The cross sections for the charge exchange deduced from the time dependence (point d), are of the order of 10⁻¹⁴ cm². The experimental data on helium mixtures will be given in a more detailed paper.

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PHONON DISPERSION MEASUREMENTS ON AN ARGON SINGLE CRYSTAL AT 4.2°K

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Phonon dispersion measurements by inelastic neutron scattering on an argon single crystal at helium temperature have been performed.

A single crystal of Ar of about 45 cm³ volume with fcc structure has been grown from Ar with natural isotopic mixture (σ_{coh} = 0.40 barn, σ_{incoh} = 0.25 barn) and an impurity concentration of 10 ppm. The growing technique, including handling and testing of the crystal, has already been described [1]. The specimen was mounted in a

cryostat such that it was completely surrounded by aluminium walls and could be cooled to liquid helium temperature.

The neutron measurements were performed with the triple axis spectrometer at the FRJ-2 reaction in Jülich. The cryostat was mounted on a special goniometer for orientation of the sample