THE SPECTRA OF SOLID XENON LUMINESCENCE EXCITED BY THE BULK ELECTRIC DISCHARGE.

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The spectra of solid xenon bulk luminescence initiated by electric discharge were observed for the first time[a]. Along with powerful excitonic resonance emission in VUV the spectrum contained numerous strong lines in UV and visible originated from the transitions between excited states of the matrix. The main peculiarity in these UV and visible spectra was the complete absence of lines belonged to neutral excited species - atom-like Xe^* and molecular-like Xe_2^* excitons, although these lines are usually very strong in xenon gas discharges. The lines of molecular ions Xe_2^+ were absent as well. The most lines were identified as atomic ion Xe^+ transitions which are unobservable in relatively dense gas due to their fast conversion into Xe_2^+. The Xe^+ lines positions were slightly (0.1 - 0.3 nm) shifted in relation to their positions in the gas phase and their shapes in many cases were rather distorted. The mechanism of solid xenon excitation and ionization by the fast electrons drifted in electric field has been proposed on the basis of experimental data analysis.

[a] E.B.Gordon, V.I. Matyushenko, V.D.Sizov, and V.B.Fokin, Optics and Spectroscopy 34, 786 (2009).