

HIGH ENERGY IONOLUMINESCENCE DECAY IN Al₂O₃

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Time-resolved ion beam induced luminescence (ionoluminescence, IL) measurements, especially those when the luminescence decay is registered after single ion impact may be efficiently used for real-time characterization of irradiating materials. Temporal resolution of single ion technique, not limited by beam pulse duration has enabled to reveal new interesting features in dynamics of dense electronic excitations in vicinity of swift ion trajectory [1,2]. The start pulses in such experiments are produced using electron emission from carbon foils generated by incoming ion. In this report we present the design of the IL detection system at IC-100 FLNR JINR cyclotron in which the start pulses are formed using electron emission immediately from the target surface. Such approach allows to narrow the instrumental response function and minimize inaccuracy in lifetime measurements arising due to dispersion in ion velocities. The experimental set-up has been used for studies of time-resolved ionoluminescence of intact and pre-damaged Al₂O₃ single crystals during single 1.2 MeV/amu Ne, Ar, Kr and Xe ion impact.

1. Kazuie Kimura, Wan Hong, Junichi Kaneko, Noriaki Itoh, Nucl Instr Meth B 141 (1998) 425-430.
2. Kazuie Kimura, Sumit Sharma, Anatoli Popov, Nucl Instr Meth B 191 (2002) 48-53.

The speaker is a student or young scientist

Yes

Section

1. Applications of nuclear methods in science and technology

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