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The emission of ion bursts from single crystal ZnO during 248-nm irradiation[1] DEMETRIOUS WILSON, ENAMUL KHAN, STEVE LANGFORD, TOM DICKINSON, Washington State University — Exposing chemical-vapor-transport grown, single crystal ZnO to 300 mJ/cm^2 pulses of 248-nm radiation (KrF excimer) produces occasional bursts of ion emission. This fluence is well below the threshold for optical breakdown near 500 mJ/cm^2, which we identify by the presence of 473-nm emission due to the $5s^2 {}^3S_1$ to $4s^1 4p^1 {}^3P_1$ transition of excited neutral zinc. The principal ion was identified as Zn^+ by quadrupole mass spectroscopy. These ions are often accompanied by electrons to form a tenuous plasma. The bursts are not correlated with pulse-to-pulse fluctuations in laser intensity. We attribute these bursts to the accumulation of laser-produced defects during prolonged irradiation. When the defect density reaches a critical value, a burst is observed.

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