

CESIUM IONIZATION AND RECOMBINATION

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Diode Pumped Alkali Lasers (DPALS) are promising candidates for high-power directed energy applications including data transmission and ballistics defense. Selection of an appropriate buffer gas for the gain media requires absence of undesirable chemical reactions while still meeting the kinetic requirements of the system. Small hydrocarbons have been investigated as a potential buffer gas, and while these meet many of the kinetic requirements of the system, they produce unwanted side products, depleting the gain media. Recent measurements including Laser Induced Fluorescence (LIF), dispersed fluorescence, and ion lifetime measurements indicate that the dominant pathway to the products involves ions and highly excited alkali atoms with very long relaxation times.