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Abstract : Based on the exothermic nature of intermetallic reactions techniques have been developed which are capable of generating high temperatures in the condensed phase. By proper selection, based on the relative vapor pressures of all the components, it is possible to selectively vaporize metals for atmospheric release applications. Laboratory experiments and ground tests conducted on a chemical system consisting of Ti/B/Al resulted in the development and flight test of an aluminum vapor release payload. A successful atmospheric experiment was conducted at Wallops Is., VA, in January 1975, involving the oxidation of atomic aluminum by molecular oxygen. Atomic aluminum was observed in resonance line fluorescence, while the product A10 was monitored from band radiation measurements. The observed kinetics of the oxidation process was in good agreement with estimates based on available laboratory chemical rate constants and on standard atmospheric properties. (Author)

Descriptors : *ALUMINUM, *UPPER ATMOSPHERE, *ATMOSPHERIC CHEMISTRY, *VAPORIZATION, *METAL VAPORS, FLUORESCENCE, REACTION KINETICS, MOLECULES, VAPORS, ATOMS, OXYGEN, OXIDATION, THERMOCHEMISTRY, BAND SPECTRA, ATMOSPHERES, LINE SPECTRA.

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