INVESTIGATION OF THE CN + C_2H_6 AND CN + CH_4 EXOTHERMIC REACTIONS VIA STATE RESOLUTION OF THE HCN PRODUCTS.

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Previous studies at high vibrational excitation utilized collisional relaxation to improve the spectroscopic characterization of the ground and first excited electronic states of HCN. Those studies also led to efficient LIF detection techniques for vibrationally energized HCN molecules. The detection capabilities are now being applied to study selected exothermic reactions via state resolution of the products. This talk will discuss our investigations of the CN + C_2H_6 AND CN + CH_4 reactions in which the HCN product molecules were probed by LIF via the first excited electronic state. In these studies the temporal dependence of HCN (v_1,v_2,v_3) was followed and state-specific bimolecular rate constants derived. The studies enabled initial vibrational state distributions to be extracted, state-specific kinetics to be resolved and the reaction mechanism to be tested.

[a]Support by the Robert A. Welch foundation and the Advanced Research Program of Texas is gratefully acknowledged.