

Rotational Energy Transfer within the $A^1\Sigma_u^+$ State of Na_2 Induced by Collisions with $(^2S_{1/2})$ Na

Rami Haj Mohamad, Khaled Hussein, and Abdel-Monhem Nachabé

Lebanese University, Faculty of Sciences III, P.O. Box 826, Tripoli, Lebanon

Reprint requests to R. H. M.; E-mail: hrami73@hotmail.com

Z. Naturforsch. **62a**, 176 – 178 (2007); received August 22, 2006

The $(v' = 34, J' = 14)$ level of the $A^1\Sigma_u^+$ electronic state of Na_2 has been selectively populated by excitation with the 578.1 nm line of a ring dye-laser with rhodamine 6G. Through collisions with $(^2S_{1/2})$ Na atoms, energy is transferred to neighbouring rotational levels in Na_2 , and the density of these levels is determined by observing the fluorescence to the electronic ground state. From previous measurements of the lifetime of the $A^1\Sigma_u^+$ state and new measurements of the intensities of collision-induced spectral lines, absolute collision cross-sections for all rotational transitions up to $\Delta J = \pm 6$ have been obtained; the total cross-section for all rotational transitions observed is: $\sigma_{\text{rot}}^{\text{total}} = 0.41 \text{ nm}^2$.

Key words: Collisional Transfers; Cross-Section; Rotational Energy.