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Ionization and charge transfer in collisions of singly charged intermediate-energy heavy ions with gas targets. J.L. SHINPAUGH, N.L. EVANS, E.L.B. JUSTINIANO, L.H. TOBUREN, East Carolina University, R.D. DUBOIS, University of Missouri - Rolla — Absolute total and partial cross sections for charge transfer and ionization are presented for collisions of C<sup>+</sup>, F<sup>+</sup>, Cl<sup>+</sup>, and  $Cl^{++}$  projectile ions with H<sub>2</sub>, He, Ar, Ne, N<sub>2</sub>, H<sub>2</sub>O, and CH<sub>4</sub> gas targets in the energy range of 25 - 200 keV/u. The cross sections were determined by measuring post-collision projectile ion charge states in coincidence with target recoil ion charge states at the 2-MV tandem Van de Graaff accelerator facility at East Carolina University. Experimental data for collision processes for low-charge-state heavy ions incident on many-electron targets in this intermediate-energy range are particularly scarce. The present results are compared to available experimental data, to the recommended (theoretical) cross sections compiled by Janev, Phaneuf, and Hunter,<sup>1</sup> and to scaling laws from Santos and DuBois.<sup>2</sup> For electron capture for singly charged ions colliding with 10-electron targets (Ne and  $CH_4$ ), the cross sections are observed to follow a single curve, independent of projectile Z, over several orders of magnitude of velocity.

<sup>1</sup>R.K. Janev, R.A. Phaneuf, and H.T. Hunter, Atom. Data and Nucl. Data Tables <u>40</u>, 249 (1988).

<sup>2</sup>A.C.F. Santos and R.D. DuBois, Phys. Rev. A. <u>69</u>, 42709 (2004).

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