

**OPTIMIZATION OF A SET OF ELECTRON-  
NEUTRAL COLLISION CROSS SECTIONS IN  
FLUORINATED NITRILE (C<sub>4</sub>F<sub>7</sub>N)**

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Plasma fluid models for high-voltage gaseous discharges rely on transport coefficients which are often calculated with an electron swarm kinetic model (e.g. Monte Carlo, Boltzmann equation). These calculations, however, require the input of a set of electron-neutral cross sections which are not well known for many gases. C<sub>4</sub>F<sub>7</sub>N (i.e. 3M™ Novec™ 4710) is one such gas. Owing to its short atmospheric lifespan and large dielectric strength, C<sub>4</sub>F<sub>7</sub>N has received recent attention as an insulating gas with significantly reduced global warming potential, when compared to SF<sub>6</sub>.

This report details the progress made in the development of a complete and self-consistent set of cross sections for electron swarms in C<sub>4</sub>F<sub>7</sub>N. MultiBolt, a multi-term Boltzmann equation solver, is utilized to optimize elastic and inelastic cross sections for the calculation of swarm parameters, which are compared with available literature. The cross section optimization procedure and considerations for the Boltzmann model will be discussed.

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