

## TRANSPORT COEFFICIENTS AND CROSS SECTIONS IN MIXTURES $\text{BF}_3$ , $\text{F}_2$ , AND F

Ž. Nikitović, V. Stojanović and Z. Lj. Petrović  
*Institute of Physics, POB 68, 11080 Belgrade, Serbia*

S.Radovanov  
*VSEA, Gloucester, MA01930 USA*

U.Cvelbar and M. Mozetič  
*Jozef Stefan Institute, 1000 Ljubljana, Slovenia*

In this paper we used the available data [1] for electron impact scattering cross sections for electrons in  $\text{BF}_3$  to calculate the transport coefficients for electrons when there is significant abundance of F and  $\text{F}_2$  radicals. Monte Carlo simulation was used to perform calculations of transport and rate coefficients in dc electric fields, crossed electric and magnetic dc fields and rf fields.

Cross section sets were compiled and tested against the swarm data and transport coefficients were calculated and measured for dc and rf fields [2] for pure  $\text{BF}_3$ . We have also tested how transport coefficients are affected by the presence of radicals such as F or the molecule  $\text{F}_2$ .

Calculations were performed by using our Monte Carlo technique for electron transport using both integration method and null collision method [3, 4]. It was found that both radicals affect critically the attachment rate as  $\text{BF}_3$  itself has a very high threshold for attachment. Even very small abundances of radicals increase the attachment by several orders of magnitude. At the same time transport properties determined by the total cross section are not affected.

1. S. Biagi, unpublished (2005).

2. O. Šašić, Z. Lj. Petrović, Z. Raspopović, L. Godet and S.

Radovanov, "Kinetics of electrons in  $\text{BF}_3$ ", 58th Annual Gaseous Electronics Conference, October 16-20, 2005, San Jose, California, p.28, *Bul. Am. Phys. Soc.* 50 (7) (2005) 28 U H2 4.

3. Z. Raspopović, S. Sakadžić, Z. Lj. Petrović and T. Makabe, "Diffusion of electrons in time-dependent  $E(t) \times B(t)$  fields", *J. Phys. D* 33 (2000) pp. 1298-1302. 4. Z. Lj. Petrović and V. D. Stojanović, "The role of heavy particles in kinetics of low current discharges in argon at high electric field to gas number density ratio", *J. Vac. Sci. Technol* A 16 (1998) pp.329-336.

---

\* Work supported by MNTRS project 141025