

Contents

1	Zusammenfassung	3
2	Abstract	5
3	Introduction	7
4	Theoretical considerations	13
4.1	Electron-molecule interactions in the gas phase	14
4.2	Cross-section and rate coefficient	17
4.3	Types of negative ion resonances (NIRs)	19
4.4	Dissociative electron attachment (DEA)	23
4.5	Electron attachment to condensed molecules	26
4.5.1	Energetics of ESD	30
4.6	Electron transmission and film charging	32
4.7	Medium enhanced DEA.	36
5	Experimental	39
5.1	Experimental setup	40
5.2	Thin film preparation	41
5.3	Trochoidal electron monochromator (TEM)	42
5.4	Desorption analysis	45
6	Results and Discussion	49
6.1	Electron initiated reactions in 1,2-C ₂ F ₄ Cl ₂ nanofilms	50
6.1.1	DEA to C ₂ F ₄ Cl ₂ molecules in the gas phase and in clusters	51

6.1.2	ESD from $C_2F_4Cl_2$ nanofilms	55
6.1.3	ESD from $C_2F_4Cl_2$ films at different coverages	61
6.1.4	Electron initiated synthesis of Cl_2	63
6.1.5	Electron energy dependence of Cl_2 formation	69
6.1.6	Proposed mechanisms of Cl_2 formation	74
6.1.7	Complete chemical transformation of a molecular film at subexcitation energies	78
6.1.8	ESD from $C_2F_4Cl_2$ in submonolayer amounts	84
6.1.9	Conclusion of results from $C_2F_4Cl_2$	90
6.2	Electron attachment to SF_5CF_3 molecules	91
6.2.1	DEA to SF_5CF_3 molecules in the gas phase and clusters	92
6.2.2	ESD from SF_5CF_3 nanofilms	95
6.2.3	ESD from SF_5CF_3 deposited onto Xe and H_2O films . .	98
6.2.4	Conclusion of results from SF_5CF_3	102
7	Summary	105
8	Appendix	109
	Bibliography	117