

CONTENTS

ABSTRACT	1
1 INTRODUCTION	3
2 AEROSOLS	5
2.1 Aerosol Sources	5
2.2 Aerosol Size Distribution	6
2.3 Aerosol Health and Climate Effects of Aerosols	7
2.4 Wood Combustion	9
3 DESCRIPTION OF HIGH RESOLUTION TIME-OF-FLIGHT AEROSOL MASS SPECTROMETER	12
3.1 Introduction and Function	12
3.2 Theory	13
3.2.1 Mass Spectrometry by Time-of-Flight and Electron Ionization	13
3.2.2 Quantification (IE, RIE and CE)	14
3.2.3 Qualification (Fragmentation Table and High Resolution)	15
3.2.4 Size Distribution	17
3.3 Source Apportionment (Positive Matrix Factorization)	18
4 OTHER INSTRUMENTS	20
4.1 Gas Chromatography-Mass Spectrometry	20
4.2 Resonance-Enhanced Multi Photon Ionization Time-of-Flight Mass Spectrometer	20
4.3 Additional Aerosol Measurement	22
4.4 Mobile Laboratory	22
5 RESULTS	24
5.1 Organic Molecular Markers and Signature from Wood Combustion Particles in Winter Ambient Aerosols: Aerosol Mass Spectrometer (AMS) and high Time-Resolved GC-MS Measurements in Augsburg, Germany	24
5.2 Spatial and Temporal Variability of Wood Combustion Organic Aerosol during Mobile Measurements in Augsburg, Germany	29
5.3 Dynamic Changes of the Aerosol Composition and Concentration during Different Burning Phases of Wood Combustion	34
5.4 Real-Time Analysis of Aromatics in Combustion Engine Exhaust by Resonance-Enhanced Multi Photon Ionization Time-of-Flight Mass Spectrometry (REMPI-TOF-MS): a Robust Tool for Chassis Dynamometer Testing	36
6 SUMMARY	39

BIBLIOGRAPHY	41
APPENDIX.....	52
LIST OF ABBREVIATIONS.....	53
LIST OF PUBLICATIONS.....	55
PUBLICATIONS FOR THE CUMULATIVE DISSERTATION.....	57
PUBLICATION 1.....	57
PUBLICATION 2.....	62
PUBLICATION 3.....	91
PUBLICATION 4.....	107
CURRICULUM VITAE.....	115