

1.5 Goals and strategy of this PhD thesis.....	36
1.5.1 Goals.....	36
1.5.2 Target compounds of the present thesis.....	36
1.5.3 Overall research strategy.....	37
References.....	39
2. Room temperature synthesis and humidity sensing properties of Bi₂O₂CO₃ nanosheets.....	55
2.1 Introduction.....	55
2.2 Experimental section.....	56
2.2.1 Synthesis of Bi ₂ O ₂ CO ₃ nanosheets.....	56
2.2.2 Analytical characterization.....	57
2.2.3 Humidity sensor fabrication and measurements.....	57
2.3 Results and discussion.....	57
2.3.1 Structure and morphology of Bi ₂ O ₂ CO ₃	57
2.3.2 Humidity-dependent impedance and capacitance.....	59
2.3.3 Complex impedance of Bi ₂ O ₂ CO ₃ sensor.....	63
2.4 Conclusions.....	64
References.....	65
3. Humidity sensing materials: Structure-activity relations among bismuth phosphates.....	67
3.1 Introduction.....	67
3.2 Experimental section.....	69
3.2.1 Syntheses.....	69
3.2.1.1 Synthesis of bismuth phosphates at different pH-values.....	69
3.2.1.2 Time-dependent synthesis of cubic bismuth phosphate.....	69
3.2.1.3 Time-dependent synthesis of monoclinic bismuth phosphate.....	69
3.2.2 Analytical characterization.....	69
3.2.3 Humidity sensor fabrication and sensing measurements.....	70
3.3 Results and discussion.....	70
3.3.1 Structure and morphology of cubic bismuth phosphate samples.....	70
3.3.2 Humidity sensing properties.....	80
3.3.3 Bismuth phosphate structure types vs. their humidity sensing mechanisms.....	86

3.4 Conclusions.....	88
References.....	89
4. Nanostructured MoO₃/SnO₂ heterojunctions for hydrogen gas sensing.....	97
4.1 Introduction.....	97
4.2 Experimental section.....	99
4.2.1 Synthetic techniques.....	99
4.2.2 Sensor fabrication and gas sensing measurements.....	99
4.3 Analytical characterization.....	100
4.4 Results and discussion.....	100
4.4.1 Structural and morphological analysis.....	100
4.4.2 Gas sensing properties.....	104
4.4.3 Mechanistic hypotheses.....	107
4.5 Conclusions.....	109
References.....	109
5. Synthetic and structural tuning of hexagonal molybdenum oxide for ammonia sensing.....	113
5.1 Introduction.....	113
5.2 Experimental section.....	114
5.2.1 Synthetic techniques.....	114
5.2.2 Sensor fabrication and gas sensing measurements.....	115
5.2.3 Analytical characterization.....	116
5.3 Results and discussion.....	117
5.3.1 Structural and morphological characterization.....	117
5.3.2 Gas sensing properties.....	124
5.3.3 Gas sensing mechanisms.....	129
5.4 Conclusions.....	134
References.....	135
Summary.....	141
Zusammenfassung.....	143
Curriculum Vitae.....	146