Abstract

In this work, perfluoroalkyl-substituted β-heteroaryl enaminones [(Ar)CHC(R)OH] (Ar = Heteroarylrest, R = C_xF_y-Gruppe) were used as chelating ligands for the synthesis of novel copper(II), nickel(II), cobalt(II) and tin(II) β-heteroarylalkenolates. These compounds show high volatility and sufficient stability which turn them into interesting CVD precursors. The compound class of metal-β-heteroarylalkenolates was marginally specified in the literature so far. Therefore these compounds were exhaustively characterized in this work. The crystallographic studies of the presented complexes allowed elucidation of the main structural properties of this compound class. Furthermore TG-DTA measurements were performed in order to determine the volatility of the synthesized compounds suitable for application during CVD processes. Thus, chosen copper(II)-, nickel(II), cobalt(II)- and tin(II) derivatives were successfully used in CVD processes. Thereby, the optimization and precise control over the CVD-process parameters allowed production of pure and highly crystalline materials.

Another important focus of this work was the functionalization of SnO_2 nanowires based on the transition metal-complexes newly prepared. Hence, the selectivity of these heterostructures to different target gases could be increased significantly allowing the construction of an efficient gas sensor. The surface functionalization of SnO_2 was carried out by means of two-step CVD-processes. The produced heterostructures show interesting sensing properties which make them to promising material for sensing devises.