Abstract: Silicon, germanium and/or tin containing derivatives carrying aryl substituents as well as hydrogen atoms seems like a well explored field in organometallic chemistry. However, a closer look reveals that despite 150 years of chemical history with these compounds, mostly only the phenyl derivatives are well characterized. Over the years our institute has also reported on the syntheses of novel compounds of this type. In extension of this work, we will present here on the synthesis and characterization of such derivatives, with emphasis on Germanium and Tin compounds of types REH₃ and R₂EH₂ (E = Ge, Sn) as well as their applications in material science, especially for the synthesis of nano-sized particles.