Almost all small dianions known from condensed phases are unstable with respect to electron autodetachment in the gas phase. These dianions show rare-gas-like closed-shell electronic ground states and represent a new type of metastable system. Here we discuss the ab initio calculation of energies and lifetimes of temporary closed-shell systems. Some methodological issues are briefly discussed, in particular, there is no “natural” choice of orbital set for metastable closed-shell states and therefore no unique one-particle level. Applications to $O^{2-}$, $C_2^{2-}$, $CN_2^{2-}$, and $CO_3^{2-}$ are presented.