The EPR $g$ factors of Cr$^{3+}$ in NaCrS$_2$ and NaCrSe$_2$ crystals are calculated from the high-order perturbation formulas based on the one-spin-orbit (SO)-coupling-parameter (i.e., the SO-coupling-parameter of the central 3d$^n$ ion) as well as the two-SO-coupling-parameter (i.e., the SO-coupling-parameter of the 3d$^n$ ion and that of ligands) models for 3d$^n$ ions in cubic octahedral sites. The calculated results (in particular for NaCrSe$_2$) based on the two-SO-coupling-parameter model are closer to the observed values than those based on the one-SO-coupling-parameter model, suggesting that for calculations of the $g$ factor of 3d$^n$ ions in covalent crystals the two-SO-coupling-parameter model is preferable to the one-SO-coupling-parameter model. The reasonableness of the calculated results from the two-SO-coupling-parameter model is discussed.

**Key words:** Electron Paramagnetic Resonance; Crystal- and Ligand-field Theory; Spin-orbit Coupling; Cr$^{3+}$; NaCrS$_2$; NaCrSe$_2$. 