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The same and not the same: The photovoltaic model system $\text{Zn}_{1+x}\text{Ge}_{1-x}(\text{O}_x\text{N}_{1-x})_2$ and its two independent modes of cation disorder revealed by Neutron diffraction.

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Alternative photovoltaic absorbers often suffer from scarce and/or toxic components. Herein, we look at the model system $\text{Zn}_{1+x}\text{Ge}_{1-x}(\text{O}_x\text{N}_{1-x})_2$, which we studied in detail using Neutron diffraction, chemical analyses and UV-VIS measurements. We show that two independent ways of cation disorder exist: one related to the chemical composition and one based on antisite defects. Despite being independent, both disorder types affect the optical bandgap energies similarly.

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