Zeolites have been extensively studied over many years due to their widely applications in catalysis, ion exchange, adsorption, and separation.[1] Knowing the structure of zeolite is important for understanding their properties and predicting possible applications of such materials. Structure determination of zeolites has remains challenging, as submicro- and nano-sized crystals are often obtained. Here, we elucidate a novel germanate-based zeolite PKU-14 with a 3D 12*12*12-ring channel system. The structure was solved by combing high-resolution PXRD, rotation electron diffraction method, NMR and IR spectroscopy. Ordered Ge4O4 vacancies inside the [46612] cages has been found in PKU-14, where a unique water dimer was located at the vacancies and played a structure-directing role.


Keywords: zeolite, rotation electron diffraction, structure determination