



**Figure S1.** The restraints used in the molecular dynamics simulation. The side chains of  $\text{Mg}^{2+}$ -coordinating aspartate residues are shown in CPK. A portion of the minodronate ligand is shown in licorice. The three  $\text{Mg}^{2+}$  cations of the active site are shown as green spheres. Restraints, represented by black lines, were used to prevent the relevant atomic distances from deviating from the crystal-structure values by applying a harmonic potential with a force constant of  $50 \text{ kcal}/\text{\AA}^2$ .