Metal compounds as tools for the construction and the interpretation of medium-resolution maps of ribosomal particles

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Procedures were developed to exploit organometallic clusters and coordination compounds in combination with heavy-metal salts for the derivatization of ribosomal crystals. These enabled the construction of multiple isomorphous replacement (MIR) and multiple isomorphous replacement combined with anomalous scattering medium-resolution electron density maps for the ribosomal particles that yielded crystals diffracting to the highest resolution (3 Å) of the large subunit from *Haloarcula marismortui* and the small subunit from *Thermus thermophilus*. The first steps in the interpretation of the 7. 3 Å MIR map of the small subunit were made with the aid of a tetrairidium cluster that was covalently attached to exposed sulfhydryls on the particle's surface prior to crystallization. The positions of these sulfhydryls were localized in difference Fourier maps that were constructed with the MIR phases.