

and  $8\text{CoO} + 3\text{Mo} = \text{Co}_2\text{Mo}_3\text{O}_8 + 6\text{Co}$ (4). Subsequent reactions of their products may be described by the equations:  $3\text{Co} + 3\text{MoO}_3 = \text{Co}_2\text{Mo}_3\text{O}_8 + \text{CoO}$ (5),  $2\text{CoO} + 3\text{MoO}_2 = \text{Co}_2\text{Mo}_3\text{O}_8$ (6), and  $2\text{CoMoO}_4 + \text{Mo} = \text{Co}_2\text{Mo}_3\text{O}_8$ (7). Reaction (5) is very rapid, whereas (6) and (7) are slow. The path (4) + (5) is thus responsible for the first rapid step of (1), the subsequent slow step being due to (2) + (6) and (3) + (7). No metallic cobalt is found in products of (1) because of its very rapid consumption in (5): However, its role as intermediate was confirmed by magnetic measurements. Metallic cobalt is very reactive even at  $300^\circ$  with  $\text{CoMoO}_4$  and  $\text{MoO}_3$ . This hints to its important role in the reconstruction of the surface of cobalt molybdate catalysts in the course of the catalytic reaction.

*The Crystal and Molecular Structure of bis(Ortho-Amino Benzoato) Copper (II),  $\text{Cu}(\text{H}_2\text{NC}_6\text{H}_4\text{COO})_2$ .* BRUCE A. LANGE AND HELMUT M. HAENDLER. Department of Chemistry, University of New Hampshire, Durham, New Hampshire 03824. Bis(ortho-aminobenzoato) copper(II),  $\text{Cu}(\text{H}_2\text{NC}_6\text{H}_4\text{COO})_2$ , crystallizes in the monoclinic space group  $P2_1/c$  with cell dimensions  $a = 12.95(1)$ ,  $b = 5.25(1)$ ,  $c = 9.39(1)$  Å, and  $\beta = 93.3(1)^\circ$ . The structure was determined using three-dimensional X ray diffraction data gathered on multiple-film equi-inclination integrated Weissenberg photographs taken about two crystal axes. Refinement with anisotropic temperature factors led to  $R = 3.1\%$ . Coordination about the copper is that of a distorted octahedron. Four equatorial positions are occupied by two amino nitrogens and two carboxylate oxygens with both the nitrogens and oxygens in the trans positions. The octahedral coordination is completed in the axial positions by two carbonyl oxygens that do not originate from the same ligands that occupy the equatorial sites. Each copper in the (100) plane is attached to four other coppers via carboxylate bridges to give a two-dimensional polymeric network coincident with the (100) plane. Significant hydrogen bonding occurs to strengthen the two-dimensional network, which, it is suggested, accounts for the extreme insolubility and high thermal stability of the compound.