SIX CRYSTAL STRUCTURES OF Cu(II) AND Ni(II) PERCHLORATES WITH THE LIGANDS OF DIAMINO DIAZADECANES. By Kelun Shu* and Chung-Sun Chung, Department of Chemistry; Tahir. H. Tahirov and Tian-buey Lu, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan 300, China.

The Cu(II) and Ni(II) complexes of aliphatic tetramines have been extensively studied. However, these complexes containing alkyl groups on carbon or nitrogen have received very little attention. In order to study the steric effect of the N-alkyl or C-alkyl groups on the structures of Cu(II) and Ni(II) complexes, we have prepared and studied six crystal structures of the complexes. The six compounds are: (A) perchlorato[10-diamo-4,7-dimethyl-4,7-diazadecane]perchlorate (B), [10-diamo-4,7-dimethyl-4,7-diazadecanediyl]di(perchlorate), (C) dicopper[10-diamo-4,7-dimethyl-4,7-diazadecane]diperchlorate, (D), dicopper-10-diamo-4,7-diazadecanediyl (E), [10-diamo-4,7-dimethyl-4,7-diazadecane]di(perchlorate) (F), perchlorato(10-diamo-4,6-dimethyl-4,7-diazadecane)diperchlorate (G).

Their coordination geometries for metal ions are: (A), five-coordinated; (B), four-coordinated, (C), six-coordinated; (D), four-coordinated; (E), three-coordinated; (F), four-coordinated. For the three Cu(II) complexes, (A) and (F): comparing N(1)-Cu-N(3) bond angles, (C) and (F): comparing N(2)-Cu-N(4) bond angles, (F) to (A)> (C). The extent of distortion in (A) is larger than in (B) and (F). Owing to two methyl groups on the central two coordination nitrogen atoms, the steric repulsion in (A) is stronger than in (C) and (F). For the three Ni(II) complexes, (B), (D), and (E); comparing N(1)-Cu-N(3) bond angles, (D) (E)> (B); comparing N(2)-Cu-N(4) bond angles, (D)> (B). The extent of distortion in (B) is larger than in (B) and (D). Owing to one methyl an internal nitrogen atom and the isopropyl on the terminal nitrogen atom, compound (E) has more steric repulsion than (B) and (D) resulting from high asymmetry. The hydrogen bonds among NH groups and perchlorate O atoms help stabilize all the crystal structures. (Work was supported by National Science Council, Taiwan, China.)