Much of our current research in f-element/crown ether chemistry has focused on the synthesis and structural characterization of crown ether complexes with hydrated f-element salts and related f-element salts and crown ethers. This work will survey our results in this area and attempt to show how hydrogen bonding patterns influence overall structure, crown conformation, and metal ion geometry. The structures of the following complexes from our group will be discussed: 

- [Th(OMe)(12-crown-4)]Cl_2·2EtOH, [Lu(OMe)_2](Na(12-crown-4))Cl_2·2EtOH, [La(OMe)_2](Na(12-crown-4))Cl_2·2EtOH, and [M(OMe)_2](Na(12-crown-4))Cl_2·15-crown-5 (M = Y, Gd, Tb, Yb, Lu, Th(OMe)_4, [Y(NO_3)_3·2EtOH, [Th(NO_3)_4·2EtOH].
- [M(OMe)(12-crown-5)]Cl_2·2EtOH (M = Y, Gd, Tb, Yb, Lu, Th(OMe)_4, [Y(NO_3)_3·2EtOH, [Th(NO_3)_4·2EtOH].
- [M(OMe)_2](Na(12-crown-4))Cl_2·2EtOH, [La(OMe)_2](Na(12-crown-4))Cl_2·2EtOH, [Lu(OMe)_2](Na(12-crown-4))Cl_2·2EtOH, and [M(OMe)_2](Na(12-crown-4))Cl_2·15-crown-5 (M = Y, Gd, Tb, Yb, Lu, Th(OMe)_4, [Y(NO_3)_3·2EtOH, [Th(NO_3)_4·2EtOH].

The trimethylene linkages in 2 give rise to a larger cavity at the centre of the ligand and force the Rh-N distances (2.102(3)-2.117(3) Å) to be significantly shorter than in 1 (2.142(3)-2.166(3) Å). The twist angle about the approximate 3-fold axis changes from 52° for 1 to 66° for 2.