

# STRUCTURAL SUPRAMOLECULAR ASSEMBLIES OF SPHERES AND TUBES

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## ABSTRACT

This thesis examines four different molecular systems that are in part or substrates for larger structural motifs that resemble spheres or tubes. The first project used donut shaped cucurbituril and through functionalization realized a new analogue, a greener synthesis for biologically important molecules called hydantoins and a new crystal motif involving potassium nitrate and cucurbit[6]uril.

The second project examined the solid state structure of  $C_{60}$  and  $C_{70}$  fullerene and how they interact with the cup shaped calixarenes. With the small addition of  $C_{70}$  that is comparable to that found in the native fullerite, the crystal structure of the resulting complex is radically changed from pure  $C_{60}$  and calix[5]arene.  $C_{70}$  with calix[5]arene was also revealed through the use of *p*-xylene.

The third project investigated the interactions between nickel macrocycles and single walled carbon nanotubes.

The final project took supramolecular hexamers from the cup-shaped pyrogallol[4]arene and produced large spherical and tubular aggregates.