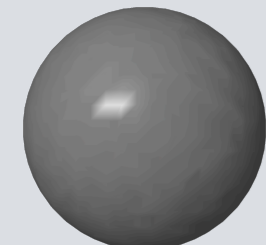



Shapes (crystalNPs as cyNP)

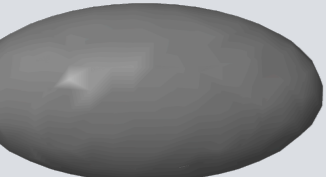
sphere
Crystal('sphere')




wire
Crystal('wire')



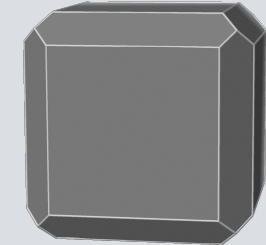
ellipsoid
Crystal('ellipsoid')



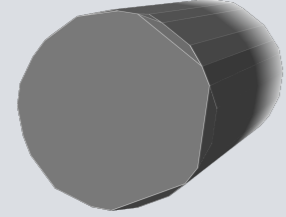
parallelepiped
Crystal('pppd')



Wulff structure
Crystal('Wulff')

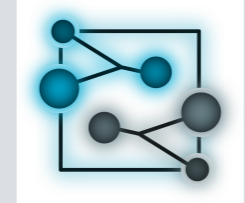


cylinder
Crystal('cylinder')



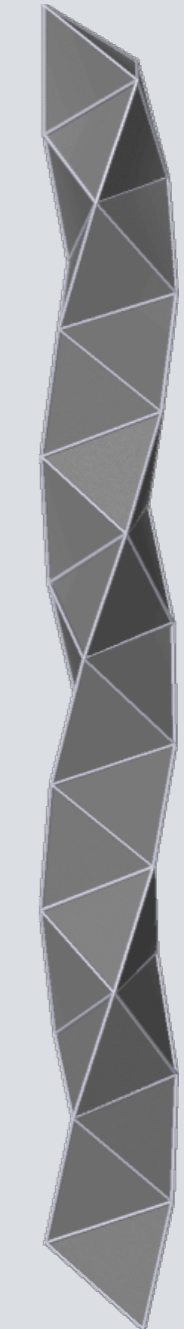
pre-defined Wulff constructions
Crystal('Wulff: acronym') cif

cube cube	truncated cube trcube	cuboctahedron cubo	rhombic dodecahedron bccrDD	tetratruncated rhombic dodecahedron ttrbccrDD	hcp spheroid hcpsph1	hcp spheroid hcpsph2
octahedron Oh	truncated octahedron trOh	deltoidal icositetrahedron dicoTd	tetrakis hexahedron {210} THH210	trapezohedron {211} TZH211	rhombicub-octahedron rhcubo	chamfered cube cfcube



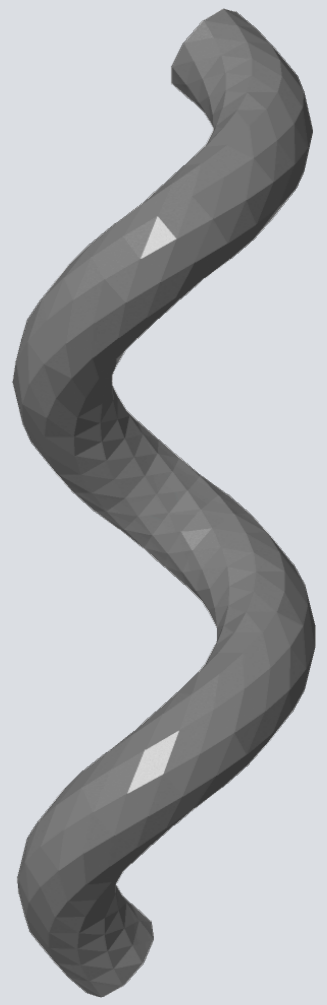
Chiral nanoparticles (chiralNPs as chNP)

Boerdijk-Coxeter helix
bch



(mathematical transformation)

applyTwist()



Johnson solids (johnsonNPs as jNP)

trigonal bipyramid fctbp	pentagonal bipyramid epbpyM(sizeP)
Ino decahedron epbpyM(+sizeE)	Marks decahedron epbpyM(+Marks)
octahedron eOhM(nOrder)	elongated octahedron eOhM(+wire_length)
Marks-like elongated octahedron eOhM(+marks_110)	

Atomically precise nanoparticles

Platonic solids (platonicNPs as pNP)

icosahedron reglco	octahedron regfccOh	dodecahedron regDD
tetrahedron regfccTd	cube cube	
fcc	bcc fcc	

Archimedean solids (archimedeanNPs as aNP)

cuboctahedron fccCubo	truncated tetrahedron fccTrTd	truncated octahedron fccTrOh
fcc	fcc	fcc

Catalan solids (catalanNPs as cNP)

rhombic dodecahedron bccrDD	dihedral rhombic dodecahedron fccdrDD
bcc	fcc

Other solids (otherNPs as oNP)

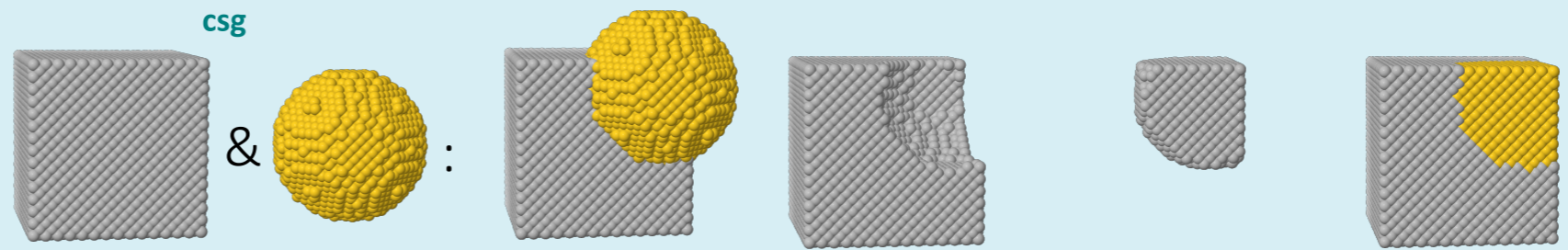
trigonal platelet fctcpt	pentatwinned nanorod ptnr: rod	pentatwinned bipyramid ptnr: bipyramid	pentatwinned ellipsoid ptnr: ellipsoid
pentatwinned elongated bipyramid ptnr: walled_bipyramid	pentatwinned double cone ptnr: double_cone	pentatwinned capsule ptnr: capsule	

Atomic-scale nanoparticle shape engineering: facet sculpting, surface peeling, symmetry operations and constructive solid geometry

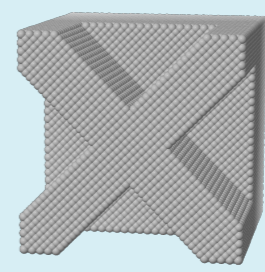
csg

c object & **s object** :

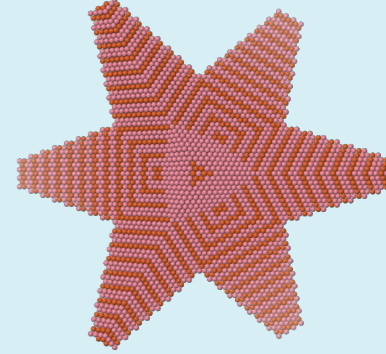
c.union_with(s) **c.cut_by(s)** **c.intersection_with(s)** **c.flush_inlay_with(s)**



facet sculpting



facet sculpting and symmetry operations



- List of Shape Engineering Functions**
- align_to_plane
 - applySlicing
 - applyTwist
 - apply_reflection
 - apply_rotation
 - clip_to_cone
 - clip_to_cylinder
 - clip_to_ellipsoid
 - clip_to_sphere
 - cut_by
 - flush_inlay_with
 - intersect_with
 - peel_by_coordination
 - peel_by_shifted_ellipsoid
 - replicate_by_reflection
 - replicate_by_rotation
 - rotate_to_align
 - round_tip_in_direction
 - union_with