

# Ferrofluids

Ferrofluid -

\_\_\_\_\_ - a dispersion of particles from ~1 nm to 1000 nm in size and suspended in a fluid

Magnetite - the name of the compound, \_\_\_\_\_

## Properties of ferrofluids

1. \_\_\_\_\_ - a force that can act at a distance between two materials due to properties of their electrons' spin and orbital motions

\_\_\_\_\_ - a phenomenon in which the internal magnetic moments of multiple spin sets of unpaired electrons within the domain of the solid do not completely cancel and therefore leave a net spin

\_\_\_\_\_ - a phenomenon in which the internal magnetic moments of unpaired electrons within a domain of the solid are aligned and act cooperatively

2. \_\_\_\_\_ - a pattern of uplifted particles that results from placing a magnet near the ferrofluid

3. they don't stick together  
Why?

A \_\_\_\_\_ has been added  
Surfactant -

4. Why aren't the spikes permanent?

Individual particles of magnetite behave as \_\_\_\_\_. Therefore, in the absence of a magnetic field and as a result of thermal agitation, the particles' magnetic domains become \_\_\_\_\_ relative to one another.

\_\_\_\_\_ - regions where unpaired electrons strongly interact with one another and align even in the absence of a magnetic field

## Unit Cells

\_\_\_\_\_ : a 3-D parallelepiped that, when shifted along each edge by the length of the edge, creates the entire structure of atoms in a crystal

Holes-

For example, in magnetite there are holes formed by oxide ions - these holes provide various environments for the iron ions

What constitutes unit cells:

Parts of a unit cell

Corner atoms = \_\_\_\_\_ atom per unit cell

Edges atoms = \_\_\_\_\_ atom per unit cell

Face atoms = \_\_\_\_\_ atom per unit cell

Inside atoms = \_\_\_\_\_ atom per unit cell

Atoms in the unit cell -

Empirical formula -