Surfa Tech Corporation
2170 Luke Edwards Road
Dacula, Ga. 30019
(678) 468- 9315 (678) 442 9624 (fax)

GROUP OPPOSITES

Tony O'Lenick

The concept of hydrophobic and hydrophilic is relatively easily understood by the formulating chemist. Simply put things that are hydrophobic are water hating materials. This simple definition works well with oil and water systems. Oils are hydrophobic (water hating), water soluble materials are hydrophilic (water loving). The other side of that coin is that oils are oleophilic (oil loving) and water soluble materials are oleophobic (oil hating).

As is normally the case, the world is more complicated. Silicone oil is neither oil soluble, nor water soluble. Silicone oil is in fact hydrophobic (water hating) and (oleophobic oil hating). Defining a phase by what it's incompatibilities is not technically appealing. Silicone oil is siliphillic (silicone loving).

The Group Opposites are:

- **Hydrophilic** (water loving) **Hydrophobic** (water hating)
- **Oleophilic** (oil loving) **Oleophobic** (oil hating)
- **Siliphilic** (silicone loving) **Siliphobic** (silicone hating)

- **Hydrophobic** (water hating) materials can be either oleophilic or siliphilic.
- **Oleophobic** (oil hating) materials may be either hydrophilic or siliphilic.
- **Siliphobic** (silicone hating) materials may be either oleophilic or hydrophilic.

Does this have any practical implications? Absolutely! Consider a hydrophobic carpet fiber. It could have be treated with silicone or with hydrocarbon. If treated with silicone, the fiber will also be oleophobic. If treated with oil, the fiber will be siliphobic. For application in waterproofing carpet fibers, selection of the proper molecule is critical. Since most people have cooking oil in their homes, and it will stain a hydrocarbon treated fiber, silicone coatings are preferred. Improper selection will result in unacceptable oil staining.

What does this mean in cosmetics? Next time you work with a treated pigment, ask yourself should my oil phase be siliphillic or oleophyllic?