

## **Self-Assembled Monolayers of Alkanethiols**

Self-assembled monolayers (SAMs) of alkanethiols have been used extensively in biomaterials research for many years. Due to their high reproducibility and ability to control the chemistry of the surface, alkanethiol SAMs provide an ideal model system. Alkanethiol SAMs provide an ideal platform for the study of material interactions with biology (proteins, cells, antibodies, enzymes, etc).

Figure 1 shows a generalized structure of an alkanethiol. As can be seen in the figure, by simply changing the chemistry of the head group, one can create a surface with an unlimited variety of surface chemical groups. This flexibility has been used extensively in the study of protein adsorption, cell binding, and DNA hybridization and more recently for modification of nanoparticles.

Alkanethiol SAMs are one of the best characterized monolayer systems around. There is an extensive set of publications with information about SAMs surface characterization with virtually any surface analytical method imaginable. Alkanethiol SAMs are typically formed on gold. This is due to the fact that gold does not form an oxide in air, allowing alkanethiols to be assembled without special pretreatments. However, alkanethiols will assemble on almost any oxide free metal surface. Examples have been shown of assembly on copper, iron, silver, nickel, platinum, palladium, and even stainless steel.

The flexibility in the modifying the chemical structure of thiols, along with the ease of assembly, make alkanethiol SAMs an ideal platform for biomaterials research. Alkanethiol SAMs enable engineering control over surface chemistry that allows the researcher to begin to approach and understand the structure function relationships that control the surface reactions that occur when man made materials interface with biological materials.

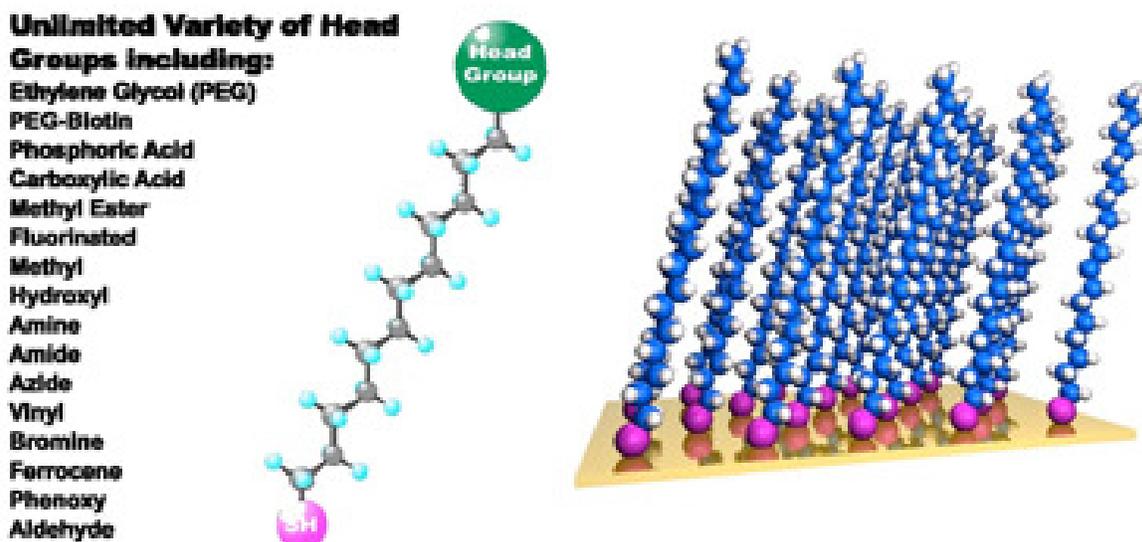


Figure 1. Schematic drawing of a generalized thiol molecule (center image) with the thiol linking group, the alkane chain spacer, and the terminal head group. The head group can be any chemical group as illustrated by the representative list of head groups on the left. The image on the right shows a schematic of a fully assembled methyl terminated monolayer on gold.

\* Figure and write-up courtesy of Asemblon, Inc:<http://asemblon.com/>