Components of SOM

Non-humic substances

-primary components
-inherited from plant & animal residues
-about 20-30% total SOM
-decompose relatively easily (months to years)
e.g. carbohydrates, proteins, lignin etc.

Humic substances

-secondary components
-formed within the soil by breaking down organic structures & synthesizing new organic compounds
-about 60-80% total SOM
-quite resistant to further decomposition

Fulvic acid

-soluble in water at any pH
-smaller size (relative to H.A.)
-large # COOH groups per unit mass
-high S.S.A. -high CEC
(due to dissociated COOH groups)
-tendency to disperse (pH 4 to 6)
-form dispersed chelates
(make metals available)

Humic acid

-insoluble in acid; soluble in alkali
-larger molecular weight than F.A.
-more phenolic ring structures
-lower # COOH groups per unit mass
(therefore H.A. are less reactive than F.A.)
-more functional groups undissociated;
tend to flocculate, and tie up metals
(large complex molecules are immobile)

Humin

-complex, recalcitrant
-large, high molecular wt.
-very resistant
to further decomposition
-good for C sequestration

Recall that between pH 4 and 6, 85-90% of carboxyl groups are dissociated