

Green rust synthesis and reactivity towards dehalogenation in presence of glycine

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Facile Green Rusts Synthesis [1]

We developed a buffered precipitation approach where glycine (GLY) is used in the synthesis sulfate green rust (GR_{SO₄}) and chloride green rust (GR_{Cl}) via co-precipitation by adding Fe^{III} salt to an aqueous solution of Fe^{II} at constant pH. Pure crystalline GRs could be quickly precipitated in the presence of 70 mM GLY at pH 8.0 (Figure 1), whereas in the absence of GLY, synthesis failed under similar conditions. In the synthesis GLY functions as both a ligand for Fe^{II} and as a storage of base enabling a stable supply of both Fe^{II} and OH⁻ for GR precipitation avoiding pH fluctuations. The new synthesis method allows for easy upscaling.



Figure 1: Schematic diagram of GRs synthesis in presence of glycine, Fe^{II} and Fe^{III} salt solutions.

Dehalogenation by GR_{Cl} in presence of amino acids [2]

Carbon tetrachloride dehalogenation by GR_{Cl} was investigated in presence of GLY and other selected amino acids. GLY, alanine or serine all resulted in remarkable suppression of undesired chloroform formation with only ~ 10% of chloroform recovery while sarcosine showed insignificant effects. We hypothesize that the CF suppression seen for amino acids is caused by stabilization of carbene intermediates via the carbonyl group.

[1] Yin et al. (2017) *J. Colloid Interface Sci.* **497**, 429–438.

[2] Yin et al. (2017) *Environ. Sci. Technol.* **51**, 3445–3452