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Oxidation Using Electron Paramagnetic Resonance

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LIST OF SYMBOLS AND ACRONYMS

| Symbol or Acronym | Definition |
|--------------------------------|---|
| ≡ | A surface group on a solid, e.g. ≡TiOH |
| ΔE_{bg} | Bandgap energy |
| Δ_{peak} | Width of mass spectrometry peak |
| λ | Wavelength, nm |
| μ_{B} | Bohr magneton, 9.274×10^{-24} A m ² |
| ν | Frequency, cm ⁻¹ |
| A | Electron acceptor |
| B_0 | Applied magnetic field (G) |
| D | Electron donor |
| e_{CB}^- | Conduction band electron |
| h_{VB}^+ | Valence band hole |
| h | Planck's constant, 6.626×10^{-34} J s |
| i | A node for one-dimensional reactive transport in GWB |
| $f(i)$ | Fraction of total rate constant used in node i |
| k_{obs} | Observed rate coefficient |
| k_{ox} | Rate coefficient for the photocatalyzed oxidation of arsenite |
| N | Number of replicates |
| R | Resolution for ICP-MS |
| t | Time |
| V_{NHE} | Volts compared to the normal hydrogen electrode |
| AA | Activated alumina |
| As(III) | Arsenite |
| As(V) | Arsenate |
| As _T | Total arsenic |
| $[\text{As}]_{\text{ads}}$ | Adsorbed arsenic concentration |
| $[\text{As}]_{\text{diss}, 0}$ | Dissolved arsenic concentration at time = 0 |
| $[\text{As}]_{\text{out}}$ | Effluent arsenic concentration |
| $[\text{As(III)}]_{\text{in}}$ | Influent arsenite concentration |
| ATP | Adenosine triphosphate |
| C/F | Coagulation/filtration |
| C/MF | Coagulation/microfiltration |
| EDR | Electrodialysis reversal |
| EPA | Environmental Protection Agency |
| EPR | Electron paramagnetic resonance |
| GFH | Granular ferric hydroxide |
| GWB | Geochemists' Workbench modeling program |
| ICP-MS | Inductively coupled plasma mass spectrometry |

| | |
|--------------------------------------|---|
| IE | Ion exchange |
| LC | Liquid chromatography |
| LS | Lime softening |
| MCL | Maximum contaminant level |
| MCLG | Maximum contaminant level goal |
| MDL | Method detection limit |
| mgd | Million gallons per day |
| O/F | Oxidation/filtration |
| P25 | Degussa P25, a brand of TiO ₂ |
| PHG | Public health goal |
| pK _{a1} (pK _{a2}) | First acid dissociation constant (second acid dissociation constant) |
| POM | Polyoxometalate, specifically SiW ₁₂ O ₄₀ ⁴⁻ |
| PQL | Practical quantitation limit |
| Pt-TiO ₂ | Platinized TiO ₂ |
| RO | Reverse osmosis |
| Ru ^{II} L ₃ | Tris(4,4'-dicarboxy-2,2'-bipyridyl)ruthenium(II), a dye |
| SEM | Scanning electron microscopy |
| SOD | Superoxide dismutase |
| <i>t</i> -BuOH | Tertiary butanol |
| TOC | Total organic carbon |
| UV | Ultraviolet light |
| XRD | X-ray diffraction |