**Redox Cycling of Fe(II) and Fe(III) in magnetite by Fe-metabolizing bacteria**

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The data contained within this data set is arranged according to the measurement technique used to collect each file. Details of the files are outlined below:

**Ferrozine**

3 files containing ferrozine spectroscopy data corresponding to Fe(II), Fe(III) and Fe(Total) concentrations. Seven columns contain:

* Time (d) – Time point of measurement in days
* R palustris/G sulf-a – Average Fe concentrations for bottle (a) containing *R. palustris*, with *G. sulfurreducens* added after 14 hours.
* R palustris/G sulf-b – Average Fe concentrations for bottle (b) containing *R. palustris*, with *G. sulfurreducens* added after 14 hours.
* R palustris/G sulf-c – Average Fe concentrations for bottle (c) containing *R. palustris*, with *G. sulfurreducens* added after 14 hours.
* Nobacteria-a – Average Fe concentrations for bottle (a) without any bacteria added.
* Nobacteria-b – Average Fe concentrations for bottle (b) without any bacteria added.
* Nobacteria-c – Average Fe concentrations for bottle (c) without any bacteria added.

**Magnetic Susceptibility**

7 data files containing percentage changes in magnetic susceptibility from the starting value (%). Magnetic susceptibility is a dimensionless quantity:

1. R palustris and G sulf redox cycle\_growing\_Fig1b

6 Columns:

* + Time (d) – Time since inoculation by *R. palustris* TIE-1 in days
  + R. palustris – average magnetic susceptibility of bottles inoculated with *R. palustris*
  + error – standard deviation of the average magnetic susceptibility of bottles inoculated with *R. palustris*
  + Time (d) – Time since inoculation by *Geobacter sulfurreducens* in days
  + G sulf – average magnetic susceptibility of bottles inoculated with *Geobacter sulfurreducens*
  + error – standard deviation of the average magnetic susceptibility of bottles inoculated with *Geobacter sulfurreducens*

1. R. palustris and G sulf redox cycling\_Fig 2a

10 columns:

* + Time (h) - Time since inoculation by *R. palustris* TIE 1in hours
  + TzeroA –Magnetic susceptibility of bottle A without bacteria
  + TzeroB - Magnetic susceptibility of bottle B without bacteria
  + TzeroC - Magnetic susceptibility of bottle C without bacteria
  + ToxA - Magnetic susceptibility of bottle A inoculated with *R. palustris* TIE-1
  + ToxB - Magnetic susceptibility of bottle B inoculated with *R. palustris* TIE-1
  + ToxC - Magnetic susceptibility of bottle C inoculated with *R. palustris* TIE-1
  + TredA - Magnetic susceptibility of bottle A inoculated with *G.sulfurreducens*
  + TredB - Magnetic susceptibility of bottle A inoculated with *G.sulfurreducens*
  + TredC - Magnetic susceptibility of bottle A inoculated with *G.sulfurreducens*

1. R. palustris and G sulf redox cycling\_Fig 2b

3 columns:

* Time (h) - Time since inoculation by *R. palustris* TIE 1in hours
* CycA - Magnetic susceptibility of redox cycling bottle A
* CycB - Magnetic susceptibility of redox cycling bottle A

1. R palustris and acetate Fig\_S1

10 columns:

* Time (h) - Time since inoculation by *R. palustris* TIE 1in hours
* R. palustris – average magnetic susceptibility of bottles inoculated with *R. palustris* TIE-1
  + error – standard deviation of the average magnetic susceptibility of bottles inoculated with *R. palustris* TIE-1
* R. palustris before Acetate+dark – average magnetic susceptibility of bottles after being inoculated with *R. palustris* TIE-1 but before being amended with acetate and placed in the dark
  + error – standard deviation of the average magnetic susceptibility of bottles after being inoculated with *R. palustris* TIE-1 but before being amended with acetate and placed in the dark
  + No bacteria – average magnetic susceptibility of bottles without bacteria added
  + error – standard deviation of the average magnetic susceptibility of bottles without bacteria added
* Time (h) - Time since start of incubation in the dark (h)
* R. palustris+Acetate+dark – average magnetic susceptibility of bottles after being inoculated with *R. palustris* TIE-1 and amended with acetate and placed in the dark
  + error – standard deviation of the average magnetic susceptibility of bottles after being inoculated with *R. palustris* TIE-1 and amended with acetate and placed in the dark

1. Paracoccus denitrificans\_FigS3a

5 columns:

* Time (d) - Time since inoculation by *Paracoccus denitrificans sp.* ATCC in days
* ATCC-a - Magnetic susceptibility of bottle A inoculated with *Paracoccus denitrificans*
* ATCC-b - Magnetic susceptibility of bottle B inoculated with *Paracoccus denitrificans*
* NoBacteria-a –Magnetic susceptibility of bottle A without bacteria
* NoBacteria-a –Magnetic susceptibility of bottle A without bacteria

1. Shewanella oneidensis\_Fig3b

5 columns:

* Time (d) - Time since inoculation by *Shewanella oneidensis sp.* MR-1 in days
* MR1-a - Magnetic susceptibility of bottle A inoculated with *Paracoccus denitrificans*
* MR1-b - Magnetic susceptibility of bottle B inoculated with *Paracoccus denitrificans*
* NoBacteria-a –Magnetic susceptibility of bottle A without bacteria
* NoBacteria-a –Magnetic susceptibility of bottle A without bacteria

1. BoFeN1 and G sulf\_Fig S4:

8 columns:

* + Time (d) – Time since inoculation by *Acidovorax sp*. BoFeN1 in days
  + No bacteria – average magnetic susceptibility of bottles without bacteria added
  + error – standard deviation of the average magnetic susceptibility of bottles without bacteria added
  + BoFeN1 – average magnetic susceptibility of bottles inoculated with *Acidovorax sp*. BoFeN1
  + error – standard deviation of the average magnetic susceptibility of bottles inoculated with Acidovorax sp. BoFeN1
  + Time (d) - Time since inoculation by *Geobacter sulfurreducens* in days
  + G. sulfurreducens – average magnetic susceptibility of bottles inoculated with *Geobacter sulfurreducens*
  + error – standard deviation of the average magnetic susceptibility of bottles inoculated with *Geobacter sulfurreducens*

**Magnetometry (AGFM – Alternating gradient force magnetometer)**

6 files containing duplicate measurements of each sample (Tzero, Tox and Tred). Duplicates are labelled a, b and c and have been corrected for sample mass. Data are separated into two tab delaminated columns:

* Field (T) – Applied magnetic field
* Magnetization (emu/g) – Measured magnetisation

**Mössbauer spectroscopy**

9 data files containing Mössbauer spectrometry data for each sample (Tzero, Tox and Tred) measured at room temperature (RT), 77 K (77) and 140 K (140). Each file contains columns of tab delimited data:

* v(mm/s) – velocity of the moving source
* Iobs – Raw data
* Icalc – Calculated fit of the data, i.e. sum of the individual component fits
* Mag. Site 1,2 or 3 - Individual sextet component fits
* Par. Site 1 – Individual paramagnetic component fits

**Temperature dependent Magnetic susceptibility**

4 files containing data for the empty furnace (used for calibration correction) and three samples (Tzero, Tox and Tred). Data are arranged in columns headed by:

* Temp – Temperature range of the measurement
* Tsusc – Corrected temperature dependent susceptibility (based on empty furnace)
* Csusc – Raw temperature dependent susceptibility
* Nsusc – Junk data
* Bulks – Empty column, no data
* Ferrt – Empty column, no data
* FerrB – Empty column, no data
* Time – Time since beginning of measurement
* Empty (applies to empty furnace) – Junk data
* Furnace (applies to samples) – Junk data

**TEM (Transmission electron microscopy)**

1 file containing the TEM image (PNG file) of the starting magnetite sample as seen in the supplementary section of the paper.

**XRD (Micro X-ray diffraction)**

4 files containing diffraction patterns for the standard (corundum) and three samples (Tzero, Tox and Tred). Data are arranged in unlabelled columns delaminated by a space.

* Column 1 – Angle (2theta)
* Column 2 – Intensity (arb unit) = intensity of the recorded signal.