The Following provides a description of contained data within:

Lockwood, Alexander P.G. and Kok Shun, Philip and Peakall, Jeffrey and Warren, Nicholas J. and Barber, Thomas and Basharat, Nabil and Randall, Geoff and Barnes, Martyn and Harbottle, David and Hunter, Timothy N. (2021) Flotation using sodium dodecyl sulphate and sodium lauroyl isethionate for rapid dewatering of Mg(OH)2 radwaste suspensions - dataset. University of Leeds. [Dataset] <https://doi.org/10.5518/990>

Image File: **Figure 1**, Schematic of batch flotation cell used for dispersed air flotation tests.

Origin File: **Figure 2** (A)(IMAGE) Scanning electron micrograph of dry Mg(OH)2 powder. (B) Particle size distributions of sonicated Mg(OH)2 dispersions agitated at 900 rpm measured using static light scattering, and non-sonicated agitated at 300 rpm measured in situ using focused beam reflectance measurement. (C) Change in the 50th cumulative percentile (d50) particle size with time of Mg(OH)2 dispersions agitated at 900 rpm, along with the addition of 10−2 M and 10−3 M KNO3 at 900 rpm. (D) The change in the volume based (vol%) particle size distribution of Mg(OH)2 agitated at 900 rpm with time.

Origin File: **Figure 3**, (A) Two region fitted Freundlich adsorption isotherm including both monolayer and bilayer adsorption profiles for (i) sodium dodecyl sulphate and (ii) sodium lauroyl isethionate collectors on Mg(OH)2. It is noted that image file: d1ra01222c-t8.tif is the maximum monolayer collector adsorption density (monolayer to bilayer transition point). (B) Calculated equilibrium concentration, Ce, established from the dosed collector concentration (Cd) minus the amount of surfactant adsorbed. The monolayer–bilayer transition concentration is shown for both surfactants by interpolation.

Origin File: **Figure 4**, Particle size distributions for Mg(OH)2 suspensions sonicated for 20 minutes, dosed with varied concentrations of sodium dodecyl sulphate (SDS) and sodium lauroyl isethionate (SLI) between 0–820 μM and 0–1000 μM respectively and stirred for 20 minutes, before analysis with static light scattering using a 900 rpm flow cell.

Origin File: **Figure 5**, Change in foam height with superficial air velocity for (A) SDS, (B) SLI, and (C) MIBC, all with 2.5 vol% Mg(OH)2 suspensions. (D) The retention time was calculated using eqn (2), with varying collector or frother concentration. Solid lines in (A) to (C) represent linear trendlines to determine the gas retention time (tr). Dashed lines in (D) represent the linear fit of the dynamic foam stability index (DFI) as per eqn (3).

Origin File: **Figure 6**, The flotation performance with increasing collector concentration for 2.5 vol% suspensions, as a measure of (A) mass percentage (P%) of Mg(OH)2 particles recovered, (B) mass percentage of water (W%) remaining in the cell, and (C) the residual Mg(OH)2 concentration (C%) in the flotation cell post flotation. (D) The corresponding mass percentage of water recovered with increasing mass percentage of Mg(OH)2 particles recovered. Connecting lines are a visual guide.

Origin File: **Figure 7**, The effect of collector concentration on the collection efficiency factor in eqn (7), displayed with an equal entrainment line. Values above the line represent a greater proportion of particles being recovered and below the line represent greater fluid recovery.

Image File: **Figure 8**, Schematic illustrating the mechanistic differences between (A) sodium dodecyl sulphate and (B) sodium lauroyl isethionate collector flotation systems.

Origin File: **Figure S1**, The change in the volume based (vol%) particle size distribution of Mg(OH)2 agitated at 900 rpm and dosed with 10−2 M KNO3 with time.

Image File: **Figure S2**, Photograph of Bikerman column during foamability tests, showing stabilised collapsed foam layers preventing further foamability readings

Origin File: **Figure S3**, The change in foam height with superficial air velocity for sodium lauroyl isethionate without Mg(OH)2 particles.