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The following folders of data have been archived:

|  |  |
| --- | --- |
| **Folder name** | **Description**  |
| Isotherm\_SM\_PNJ.zip | Contains the file that is opened by Nima trough software and the corresponding ascii file for the isotherm in the supporting information. The ascii file can be opened in any suitable data analysis software. Folder also contains a .txt file with information on the lipid solution used in the measurement, to enable calculation of area per molecule from the provided data. |
| Echem\_SM\_PNJ.zip | Our software outputs ascii files directly. This folder contains an ascii file for the differential capacitance measurement and three folders containing sets of current transients. A .txt file is included to explain how to convert the raw data to the data presented in the paper. |
| AFM\_SM\_PNJ.zip | Three samples were imaged so this folder contains subfolders for each sample and a .txt file with a link to the Gwyddion software used for data processing. That software is free. Within each folder are the data from the instrument; Gwyddion will import these data and can be used to produce scaled tiff files of each image. |
| IR\_SM\_PNJ.zip | Contains four subfolders and a .txt file with information on how the data are used (refers to an online resource for the details).One subfolder contains the optical constants. The other subfolders are named after the relevant wavenumber range and contain data from in situ PM-IRRAS experiments. Within each of those are subfolders containing the data for replicate measurements (the spectrometer's files and ascii files are both provided). The .txt file explains the naming of the files within these folders. |
| Xray\_SM\_PNJ.zip | Contains two subfolders: GIXD and XRR. GIXD contains a subfolder for DPPC, a subfolder for SM and a .txt file, which gives the filenumbers and the image detector filenames for each image. It also gives instrumental parameters and a procedure for scaling the image files (to convert pixel number to a value of momentum transfer in each direction). Within each subfolder, each diffraction dataset is associated with one .dat file and two detector image files (each with its own metadata file). The .dat file in the parent GIXD folder indicates the relevant detector image filenumbers. XRR contains a subfolder for DPPC and a subfolder for SM. Each of these folders contains two subfolders, one for each measurement. Within these can be found a .dat file and the associated detector image files. The .dat files already contain the data extracted from the image files to be used for data reduction to reflectivity *vs* momentum transfer. The XRR parent folder also contains a .txt file to explain the procedure for data reduction and a .txt file listing the filenumbers for sample measurements and the normalisation files used. |

**Publications related to the dataset**: Influence of Lipid Backbone on Electrochemical Phase Behaviour (under review).