SUPPORTING INFORMATION



Figure S1. Optical micrograph (150 pixels per inch) of a coke B sample showing the wear track generated during tribology testing.

A high resolution optical image of the wear path generated in a coke B sample during tribology testing is shown in Figure S1 (labelled). One of the cavities, which resulted from the adhesive removal of an inert, is labelled. An inert which resisted both adhesive and abrasive wear is also labelled ('IMDC'). (N.B. The holes shown were drilled into the sample to fit the rotational stage of the tribometer.)



Figure S2. High magnification SEM micrograph of the floor of a cavity in a gold coated coke B sample.

Figure S2 shows a high magnification area of the SEM image shown in Figure 6, in which a cavity was generated in the microstructure of the coke B sample due to the adhesive displacement of a thin surface layer of IMDC during tribology testing. The topography of the cavity floor indicates that pores were agglomerated within a thin plate-like structure in this region. The fracture faces, such as the example labelled, suggest that there were regions where the RMDC at the cavity floor was bound to the thin surface layer of IMDC that was removed during the test, forming the cavity evident in the micrograph upon its removal.