

Supporting information

New insights on the decomposition mechanism of Molybdenum Dialkyldithiocarbamate (MoDTC): A Raman spectroscopic study

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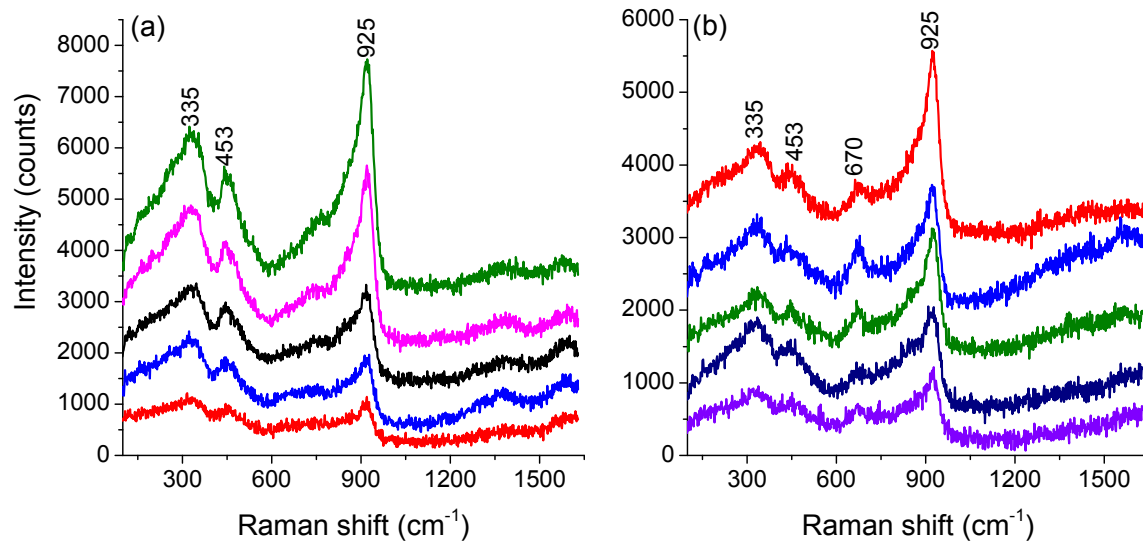


Figure S 1. Raman spectra obtained from different regions of the tribopair wear scars after tests with 0.5 wt% MoDTC at 20°C. (a) Ball wear scar (b) disc wear scar

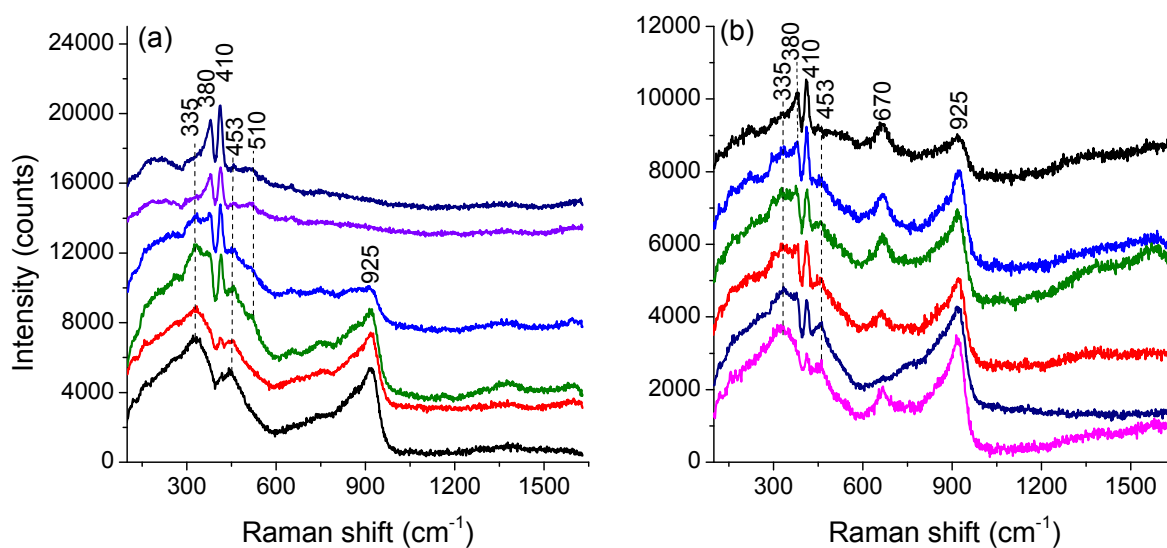


Figure S 2. Raman spectra obtained from the tribopair wear scars after tests with 0.5 wt% MoDTC at 40°C. (a) Ball wear scar (b) Disc wear scar.

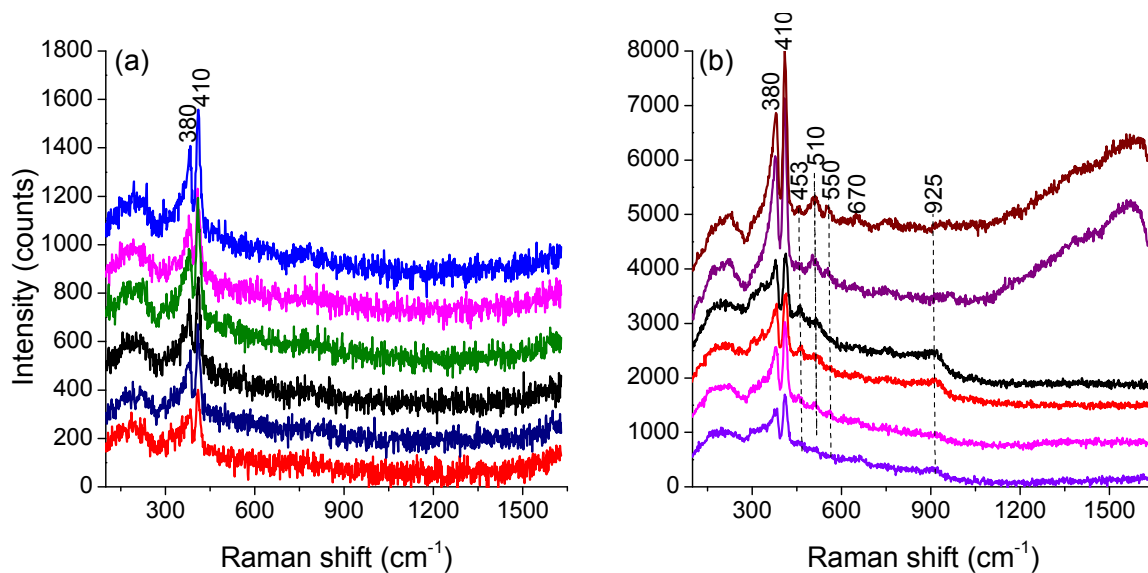


Figure S 3. Raman spectra obtained from the tribopair wear scars after tests with 0.5 wt% MoDTC at 60°C. (a) Ball wear scar (b) Disc wear scar

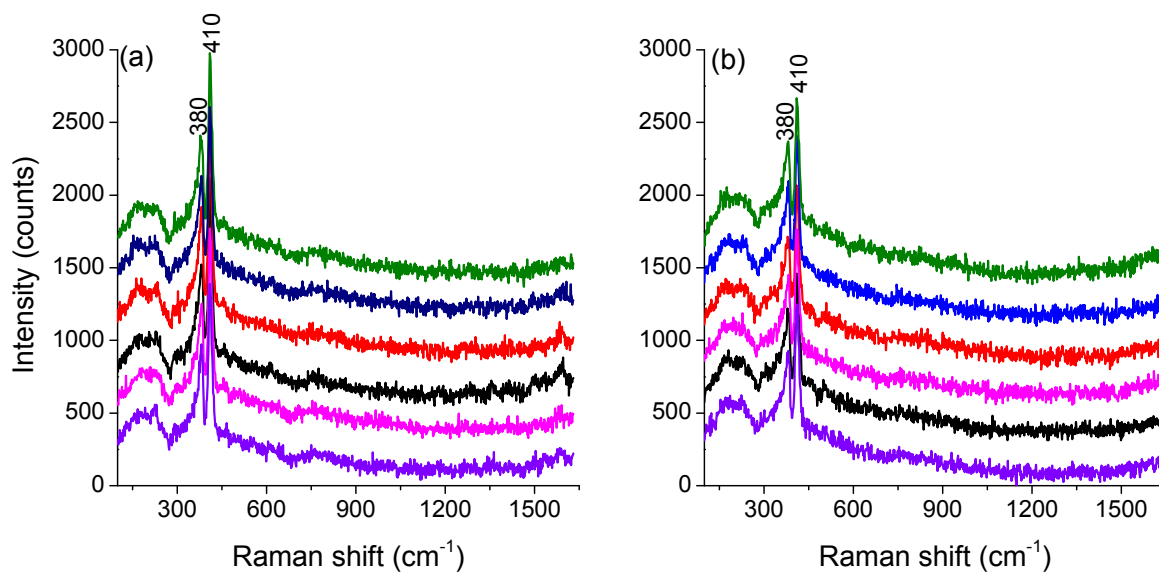


Figure S 4. Raman spectra from the tribopair wear scars after tests with 0.5 wt% at 100°C. (a) Ball wear scar (b) disc wear scar

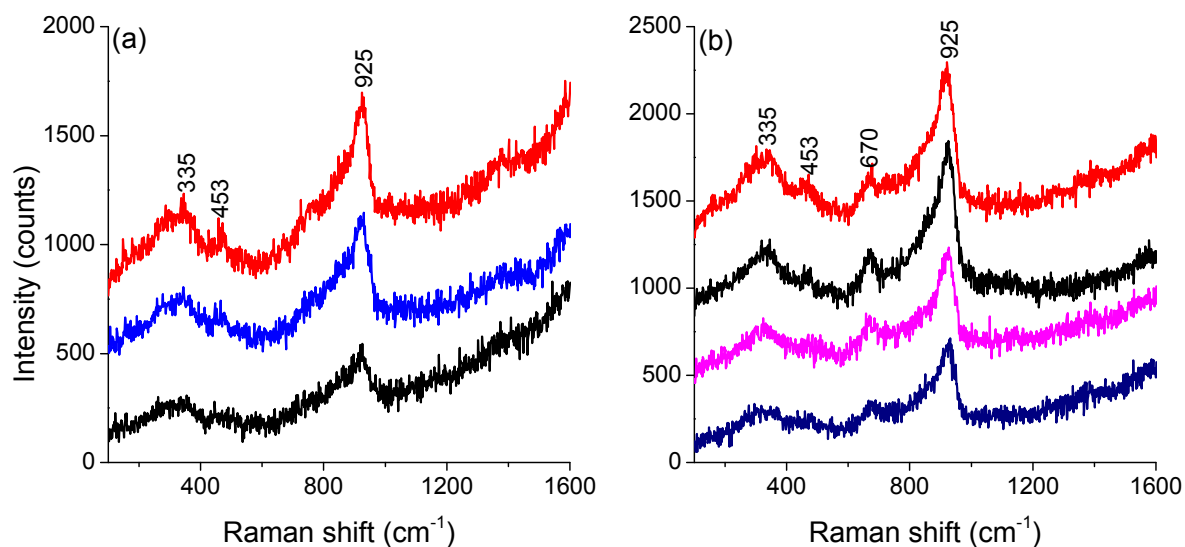


Figure S 5. Raman spectra obtained from the tribopair wear scars after tests with 0.1 wt% MoDTC at 60°C. (a) Ball wear scar (b) disc wear scar

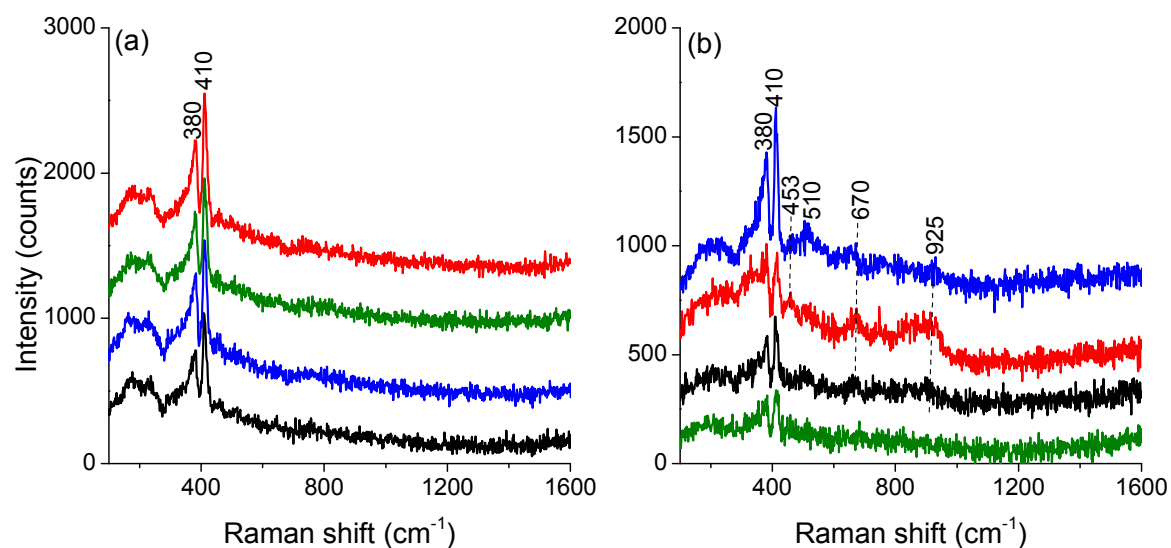


Figure S 6. Raman spectra obtained from the tribopair wear scars after tests with 0.5 wt% MoDTC at 60°C. (a) Ball wear scar (b) disc wear scar

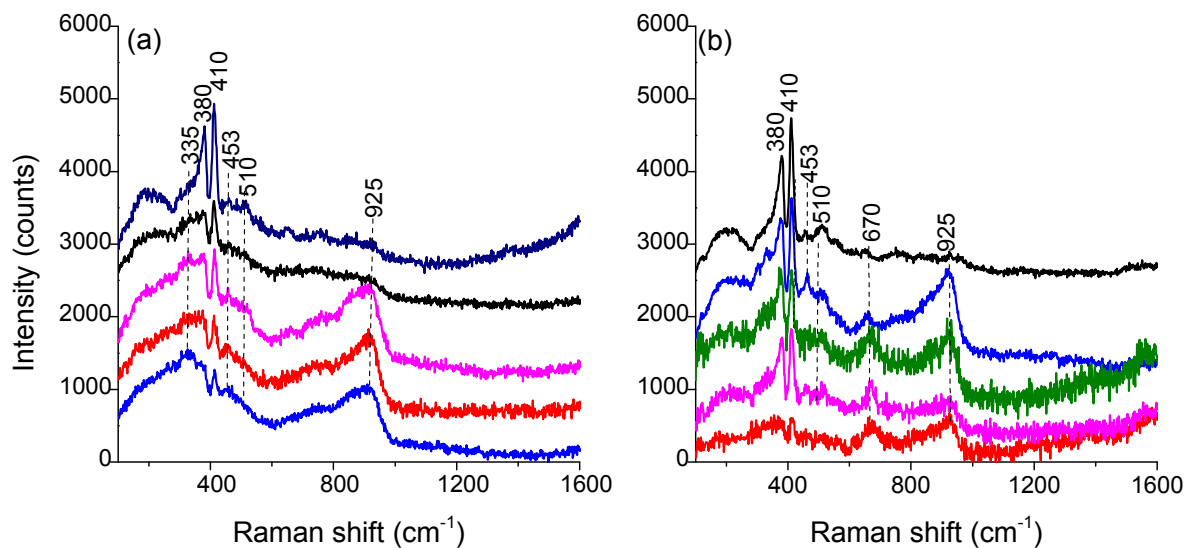


Figure S 7. Raman spectra obtained from the tribopair wears scar generated with 0.9 wt% MoDTC at 60°C. (a) Ball wear scar (b) disc wear scar

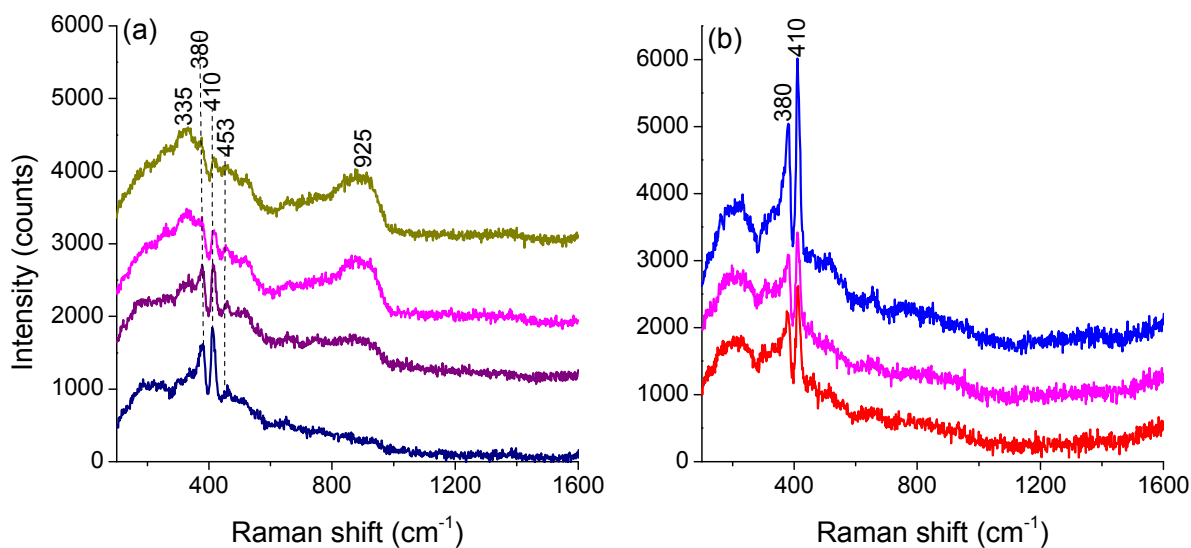


Figure S 8. Raman spectra obtained from the tribopair wear scars after tests at 0.98 GPa. (a) Ball wear scar (b) disc wear scar

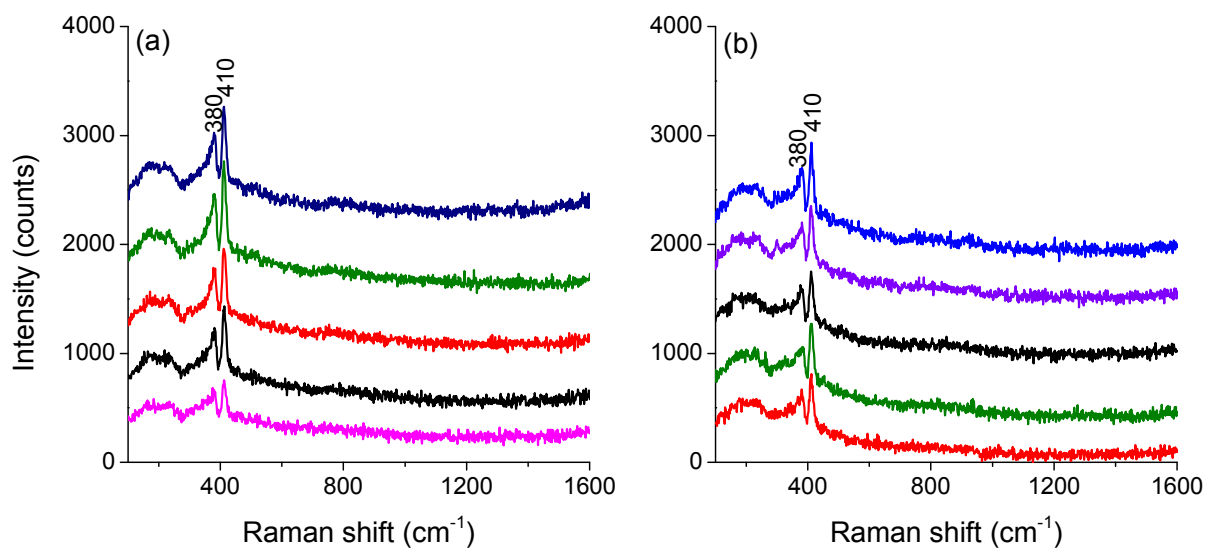


Figure S 9. Raman spectra obtained from tribopair wear scars after tests at 2.12 GPa at 60°C. (a) Ball wear scar (b) disc wear scar

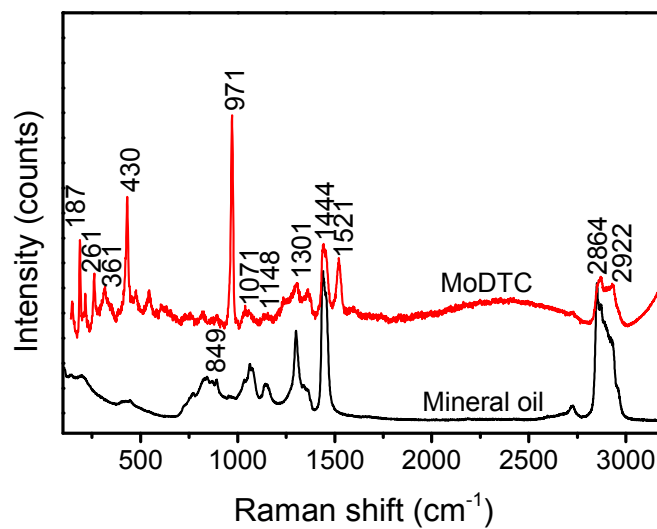


Figure S 10. Raman spectra of Group III mineral oil used as the base oil and MoDTC additive concentrate

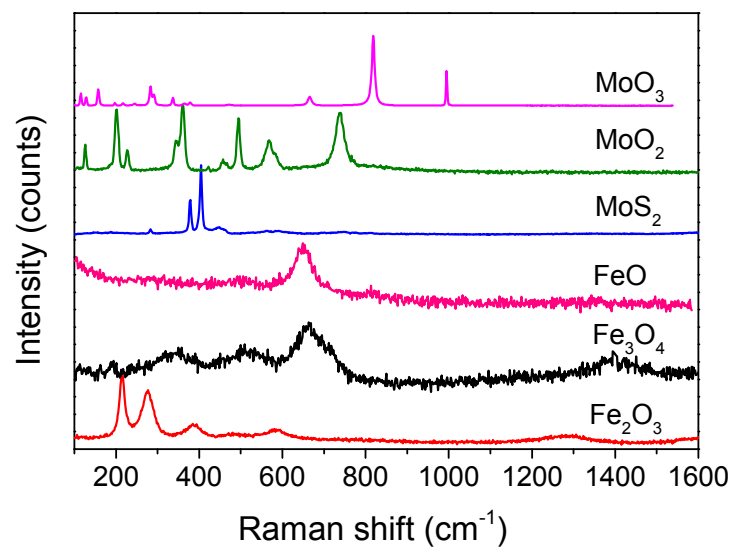


Figure S 11. Raman spectra of pure microcrystalline powders

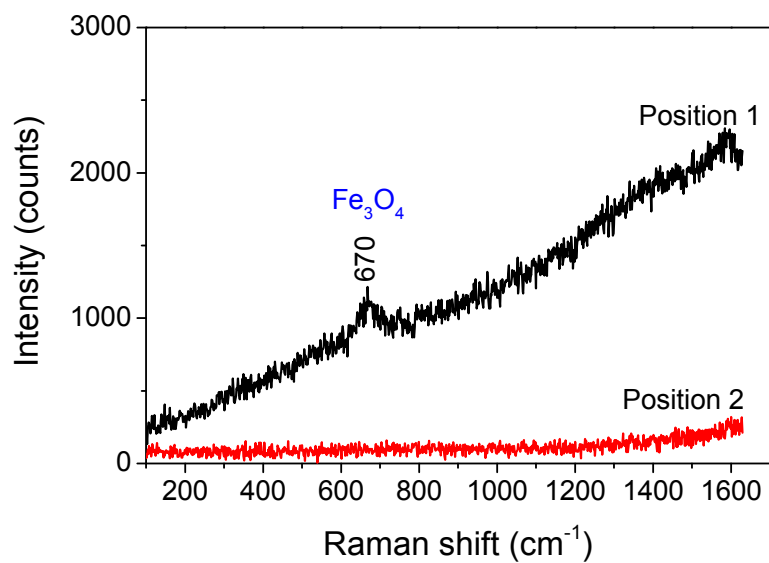


Figure S 12. Examples of Raman spectra obtained outside wear scars. In most regions no Raman peaks were observed. In some regions, Fe_3O_4 peak $\sim 670 \text{ cm}^{-1}$ was observed

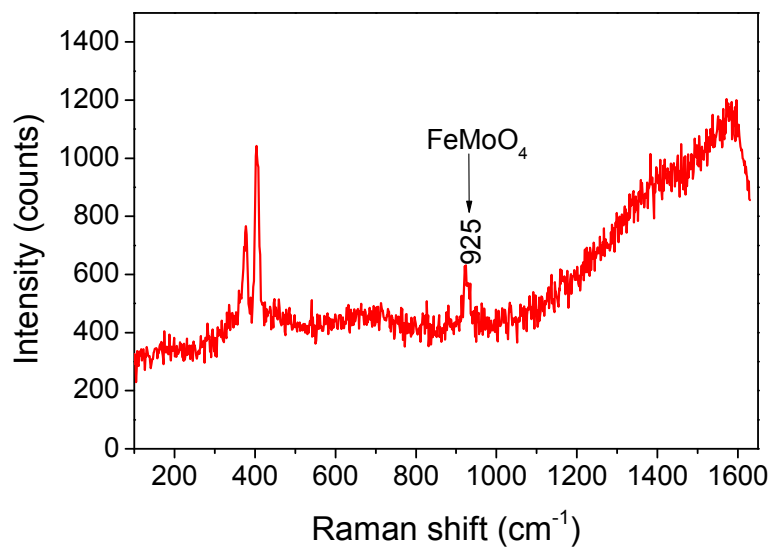


Figure S 13. Raman spectrum obtained from Fe_3O_4 deposits after heating 1 wt% MoDTC lubricant containing 5 wt% Fe_3O_4 at 100°C for 1h

Table S1. Bond dissociation energy for bonds in MoDTC

Bond type	Bond dissociation energy (kJ mol^{-1})
Mo-S	450
Mo=O	420
C-H	410
C-C	350
C-N	300
C-S	260