Supplementary Information

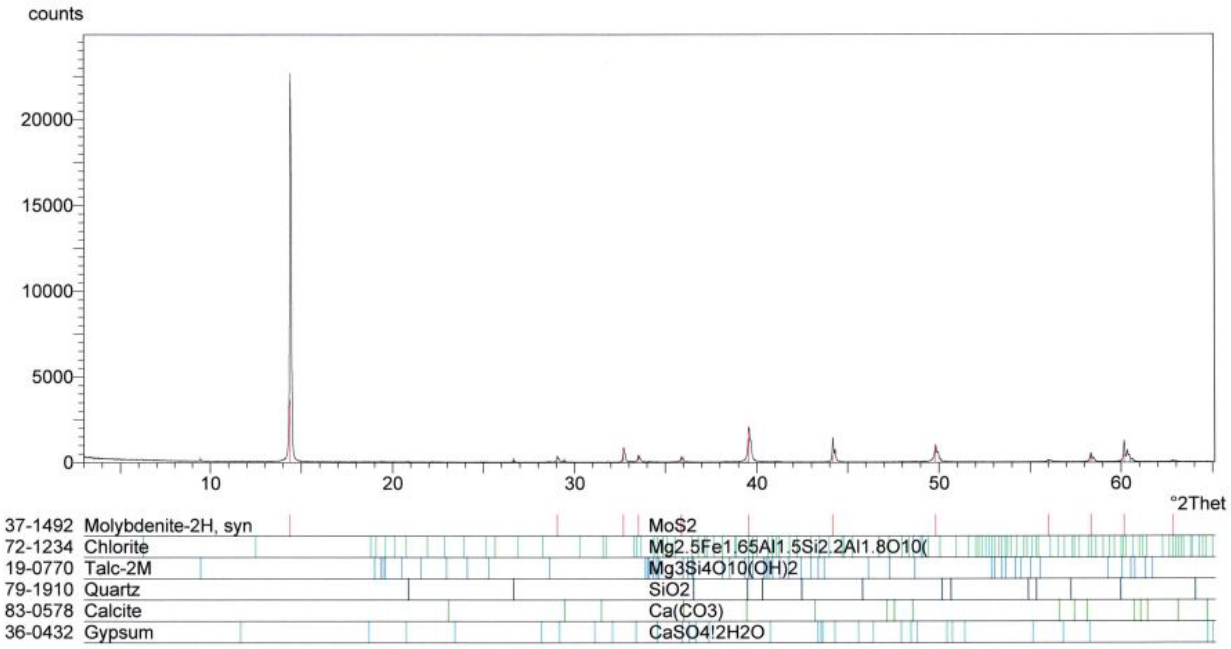


Figure S1. X-ray diffraction pattern of the CFC sample. The major peaks correspond to the molybdenite phase (MoS_2, JCPDS No. 37-1492), while minor peaks indicate the presence of silicate gangue minerals, including quartz (SiO_2) and chlorite.

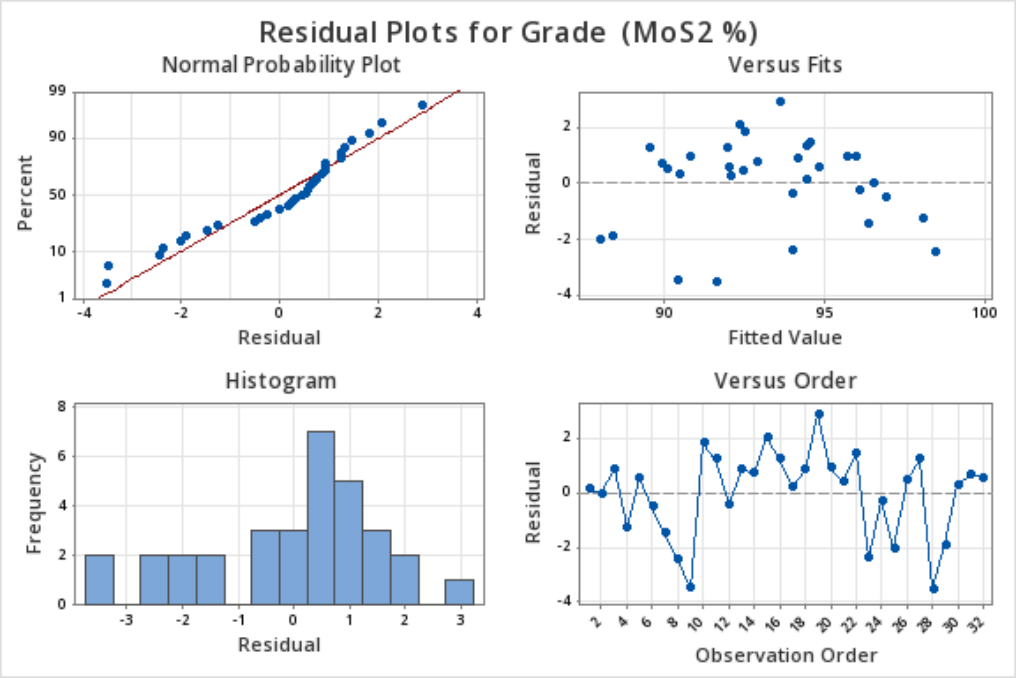


Figure S2. Residual plots for the MoS_2 grade: (a) Normal probability plot, (b) Residuals vs. fitted values, (c) Histogram, and (d) Residuals vs. observation order. The linear trend in the normal probability plot and the random distribution in the versus fits plot confirm the normality and homoscedasticity of the model.

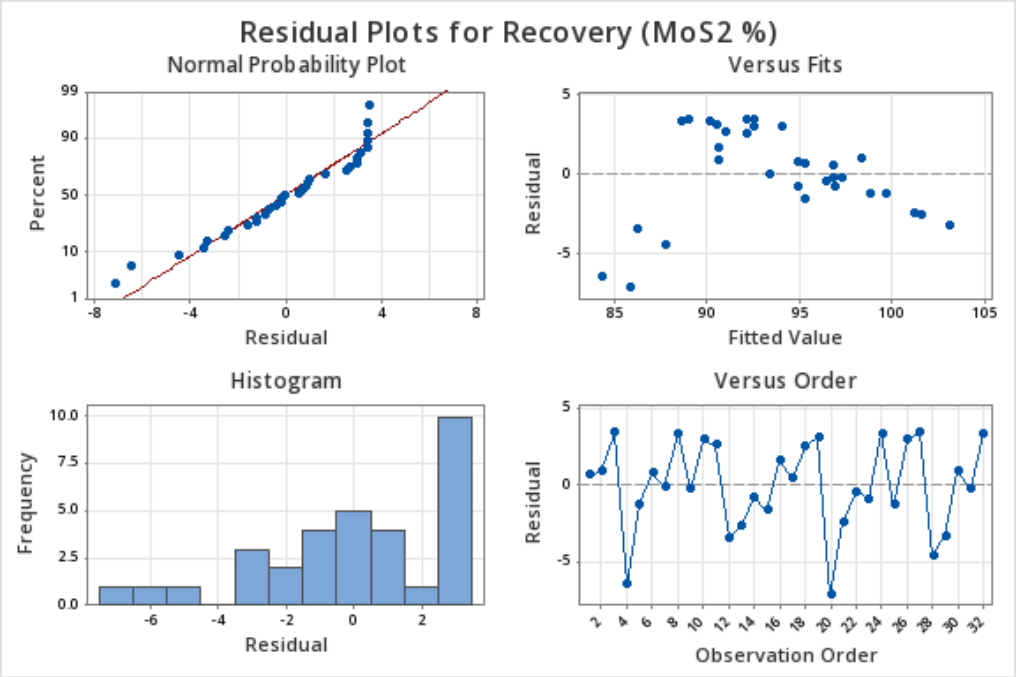


Figure S3. Residual plots for the MoS_2 recovery: (a) Normal probability plot, (b) Residuals vs. fitted values, (c) Histogram, and (d) Residuals vs. observation order. These plots demonstrate that the error terms are independently and identically distributed, further validating the statistical adequacy of the recovery model.