Supplementary materials
for
Temperature Dependences of IR Spectra of Humic Substances of Brown Coal

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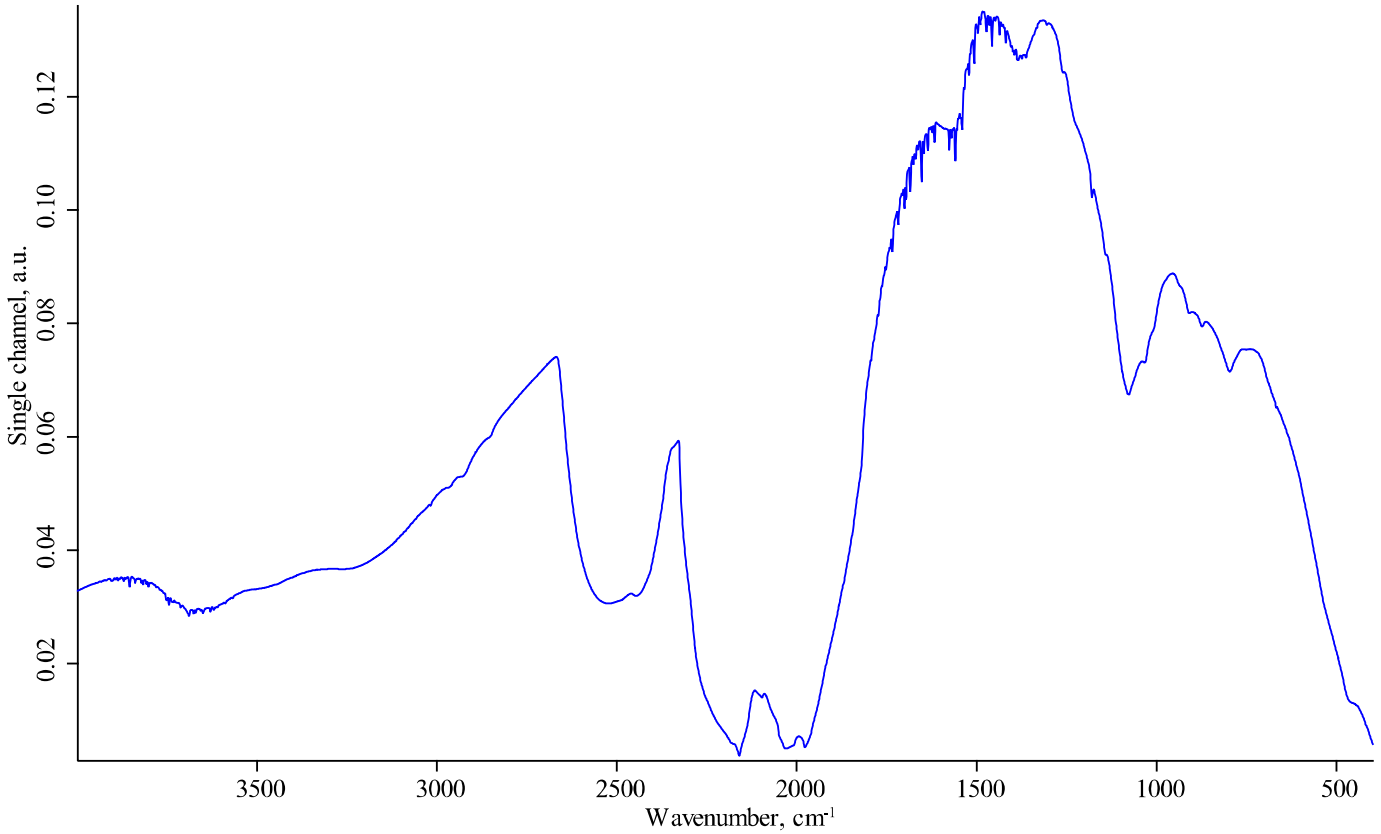

Figure S1. Single-channel spectrum of Powhumus humate sample. Y-axis (Single channel) has the units of arbitrary intensity units

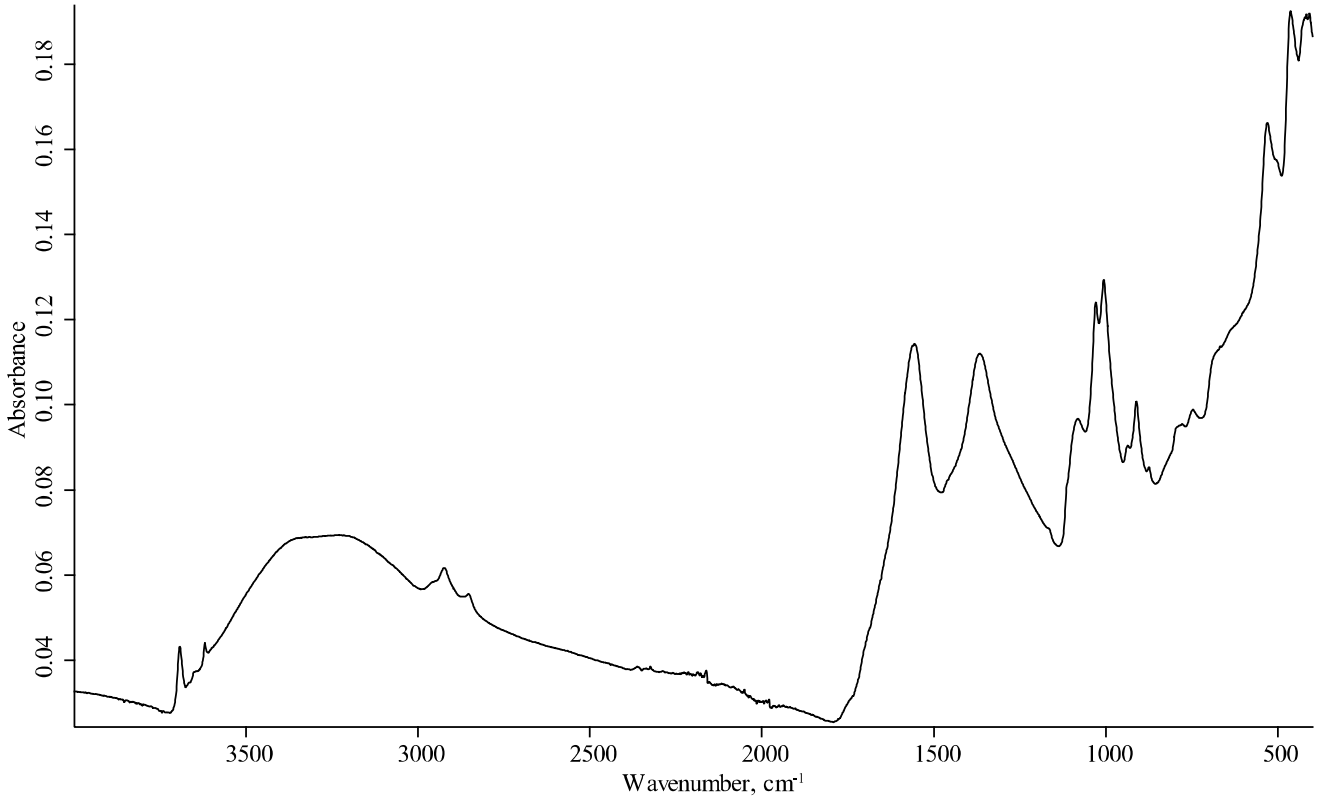

Figure S2. FTIR spectrum of Powhumus after the registration

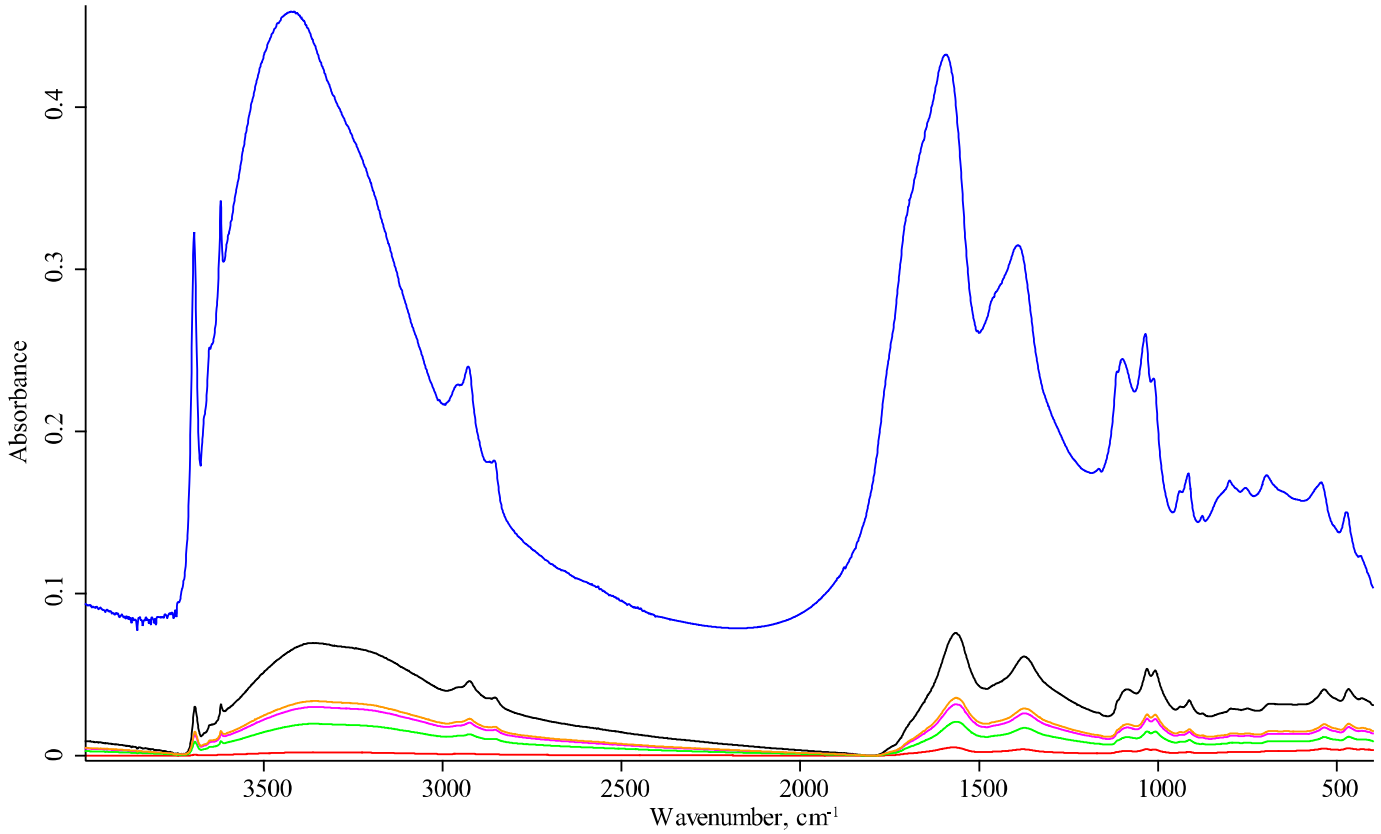

Figure S3. Spectra of the Powhumus sample after ATR correction using various refractive indices: orange, 1.5; green, 1.6; red, 1.7; violet, 1.8; black, 1.9; and blue, 2.0.

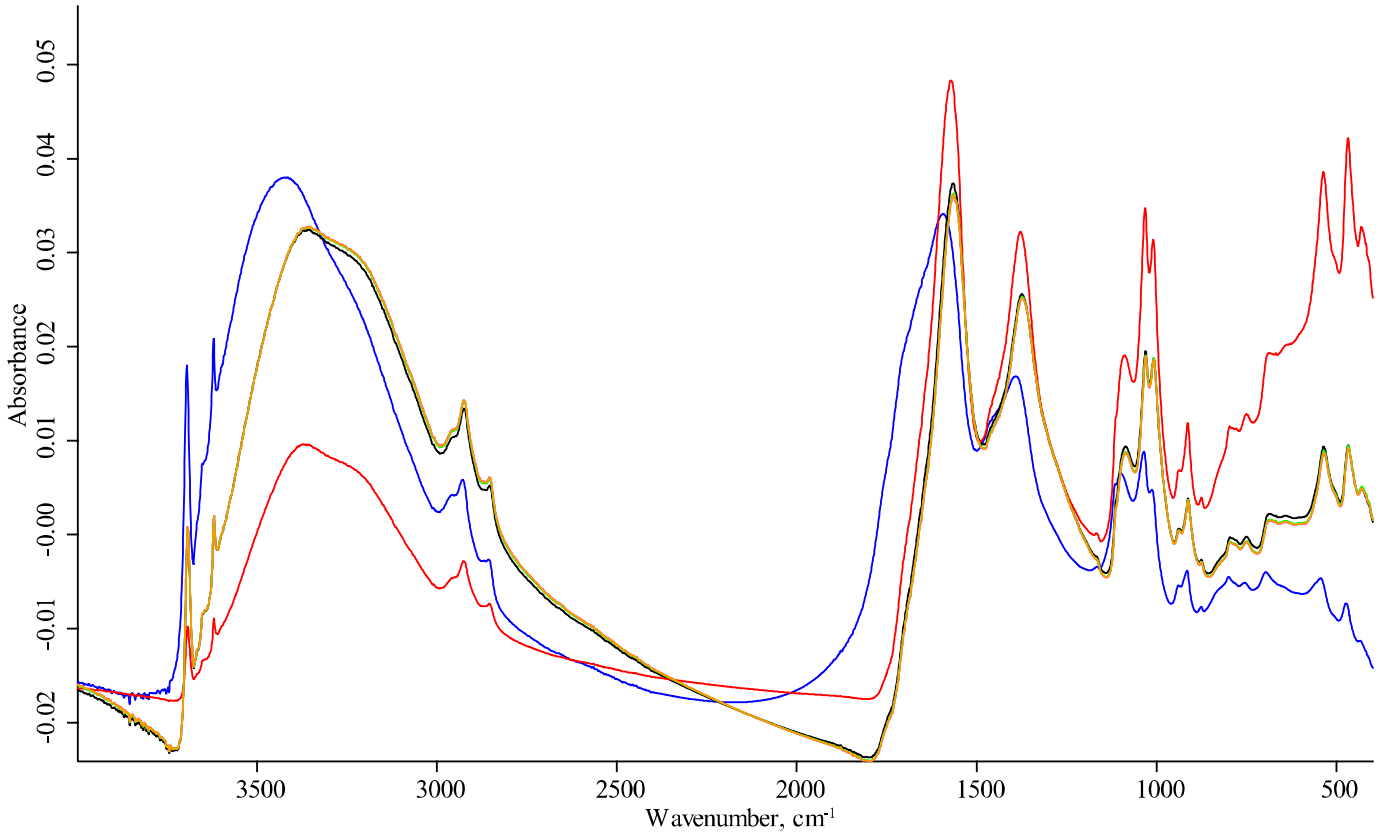

Figure S4. Spectra of the Powhumus sample after ATR correction using various refractive indices: orange followed by vector normalization by intensity, 1.5; green, 1.6; red, 1.7; violet, 1.8; black, 1.9; and blue, 2.0.

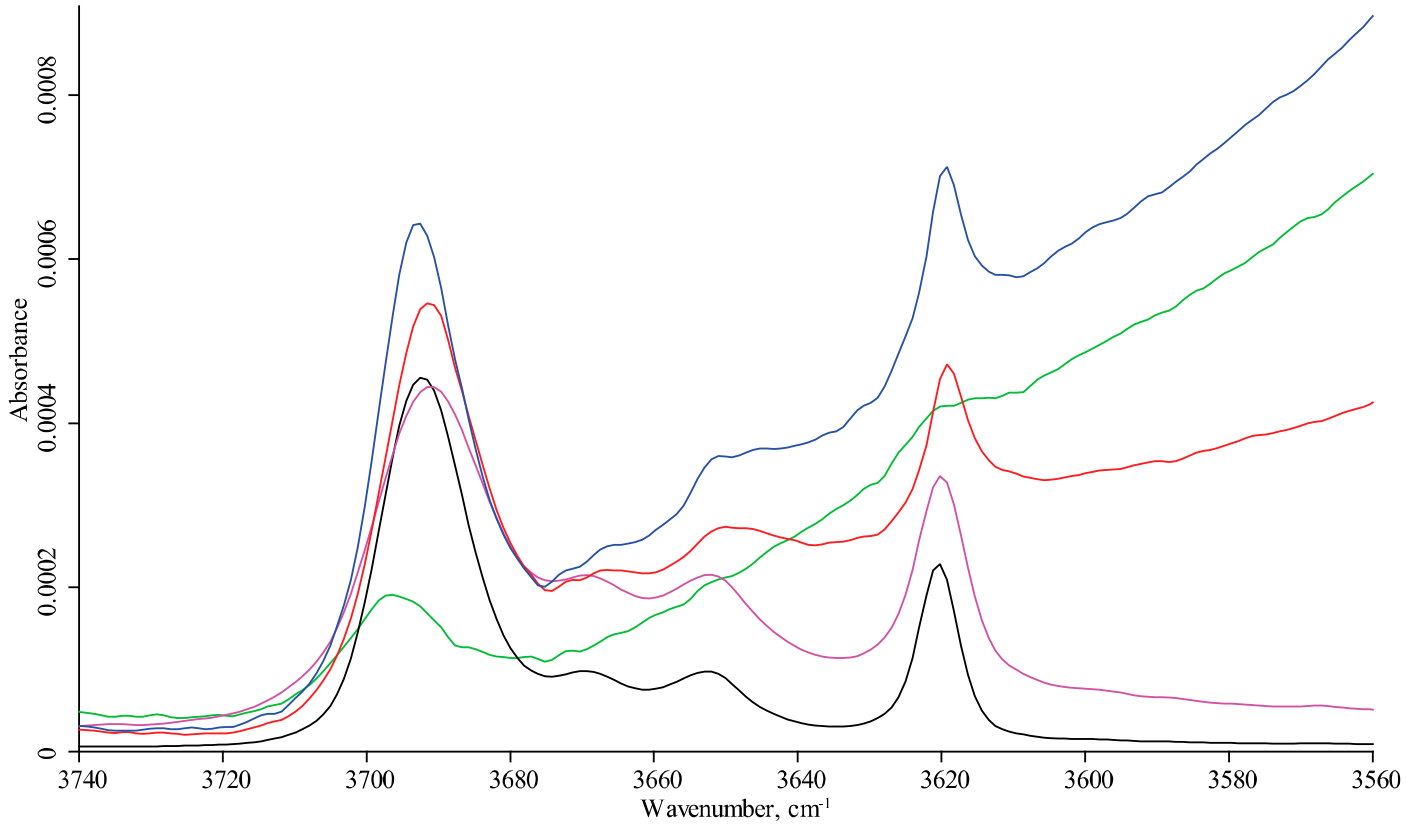

Figure S5. IR Absorption spectra in the range 3740–3560 cm^{-1} after ATR correction (with a refractive index of 1.7) of the Sigma-Aldrich (red line), Powhumus (blue line), Sakhalin (green line) samples. The rest of the spectra refer to kaolinite using ATR refractive index corrections of 1.5 (violet line) and 1.7 (black line).

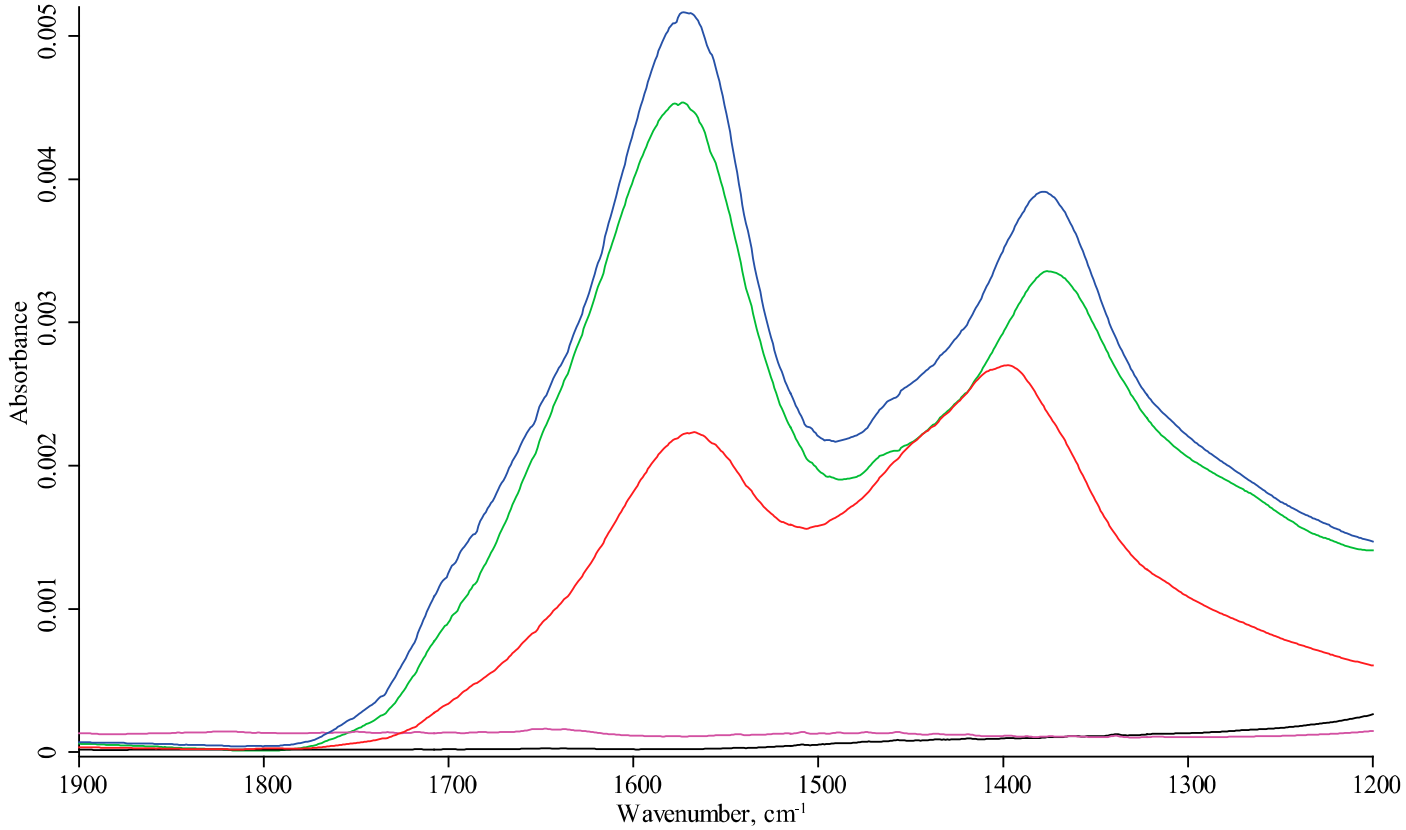

Figure S6. IR Absorption spectra in the range 1900–1200 cm^{-1} after ATR correction (with a refractive index of 1.7) of the Sigma-Aldrich (red line), Powhumus (blue line), Sakhalin (green line) samples. The rest of the spectra refer to kaolinite using ATR refractive index corrections of 1.5 (violet line) and 1.7 (black line).

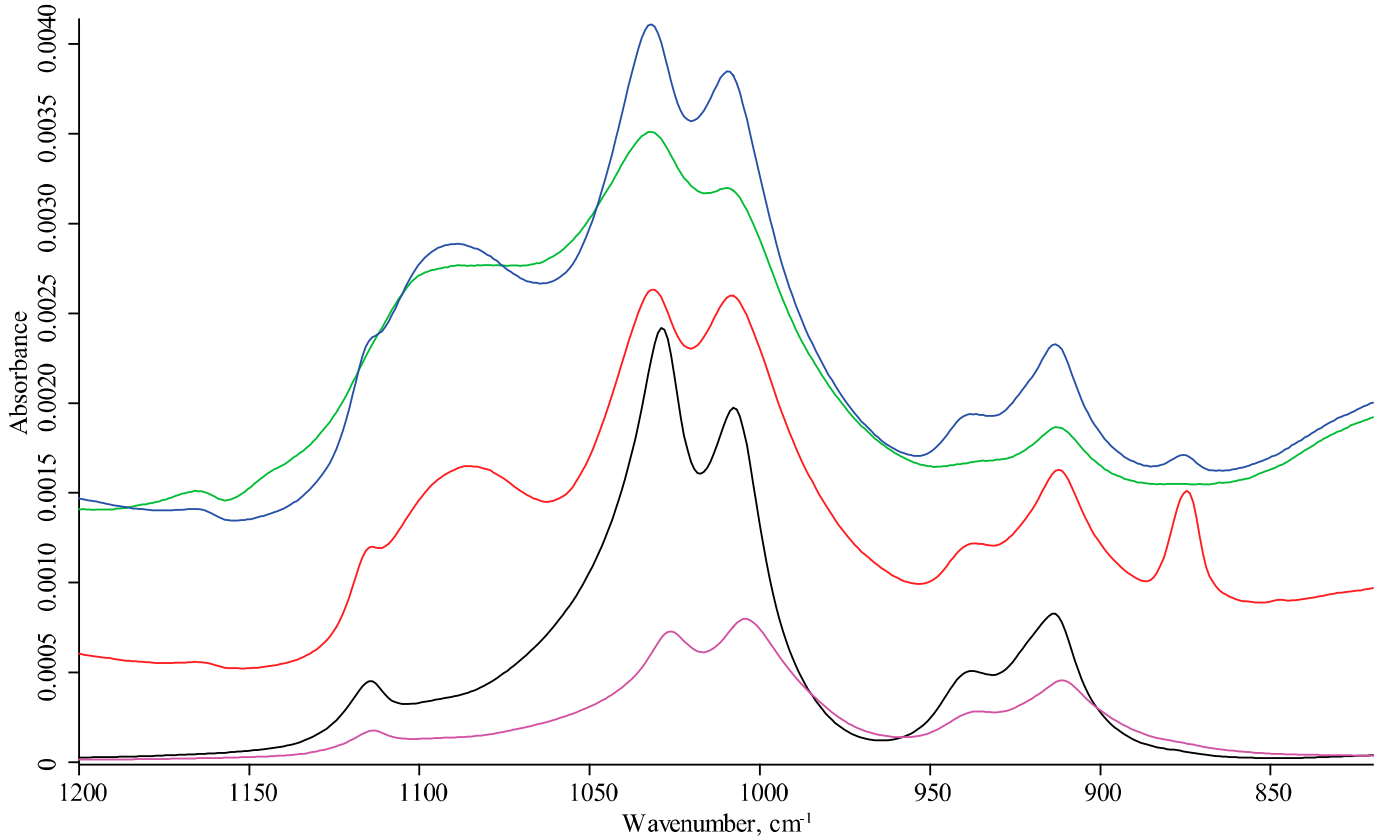

Figure S7. IR Absorption spectra in the range 1200–820 cm^{-1} after ATR correction (with a refractive index of 1.7) of the Sigma-Aldrich (red line), Powhumus (blue line), Sakhalin (green line) samples. The rest of the spectra refer to kaolinite using ATR refractive index corrections of 1.5 (violet line) and 1.7 (black line).

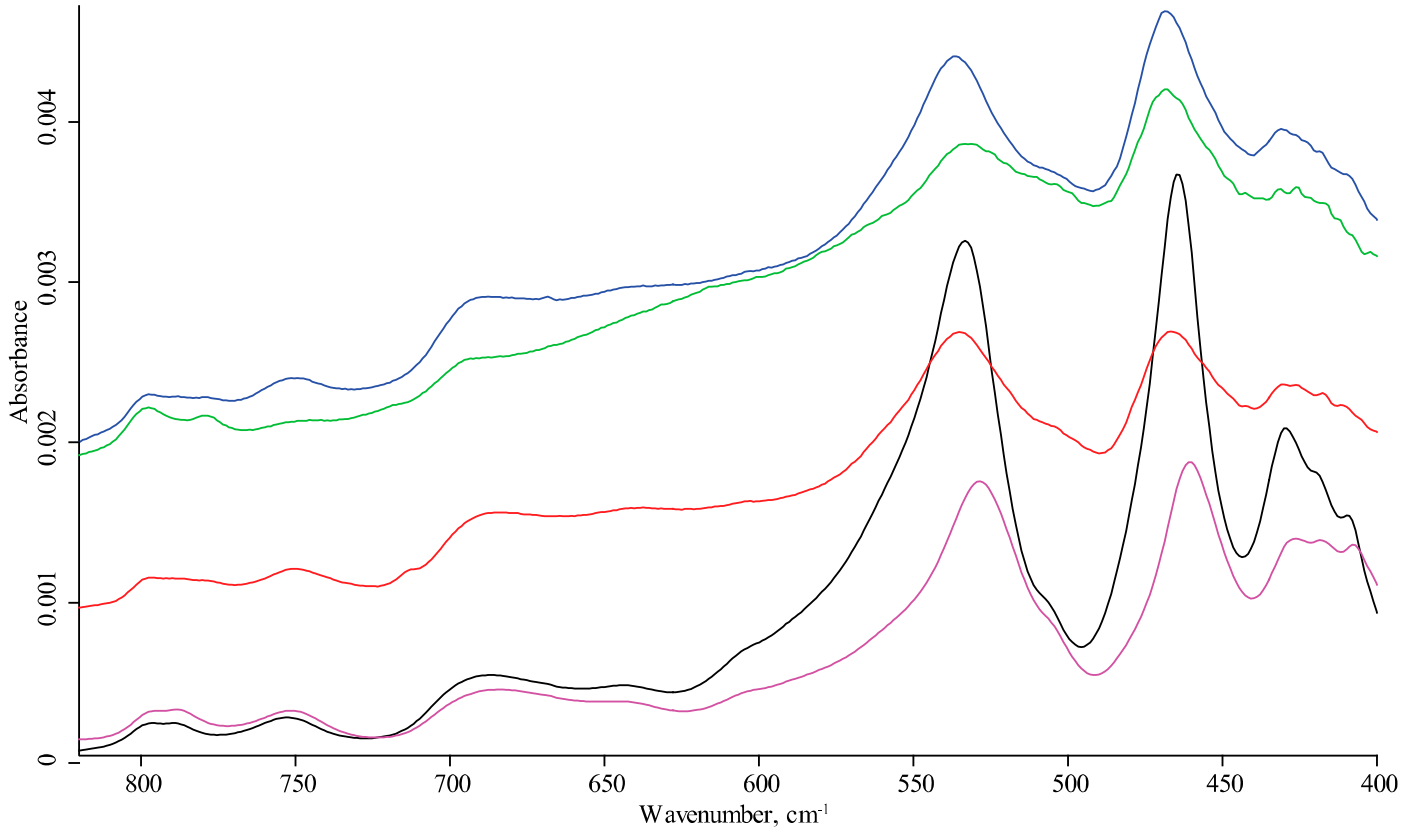

Figure S8. IR Absorption spectra in the range 820–400 cm^{-1} after ATR correction (with a refractive index of 1.7) of the Sigma-Aldrich (red line), Powhumus (blue line), Sakhalin (green line) samples. The rest of the spectra refer to kaolinite using ATR refractive index corrections of 1.5 (violet line) and 1.7 (black line).

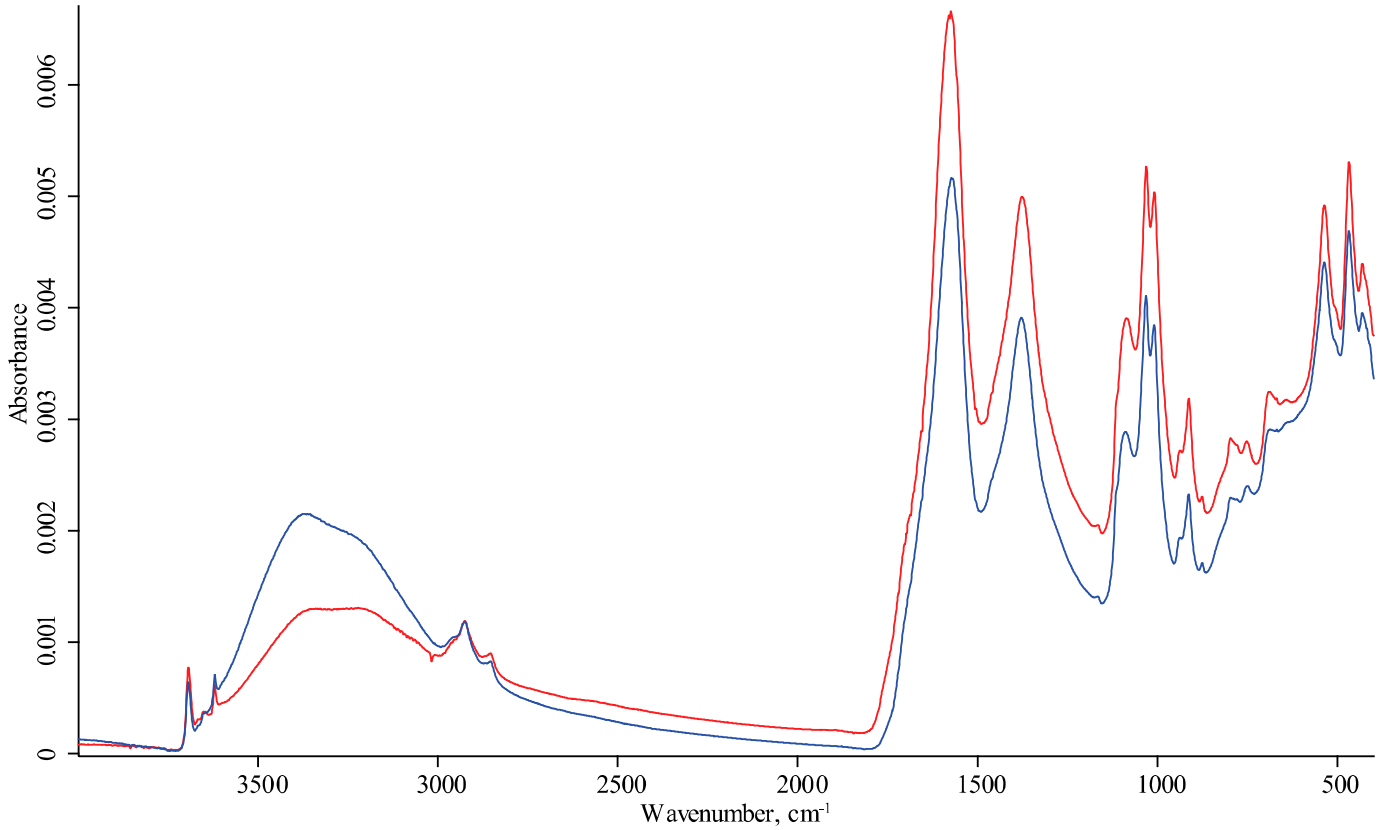

Figure S9. IR Absorption spectra in the range 4000–400 cm^{-1} after ATR correction of the Powhumus sample before heating at 25 °C (blue line) and after heating to 215 °C and cooling to 25 °C (red line).

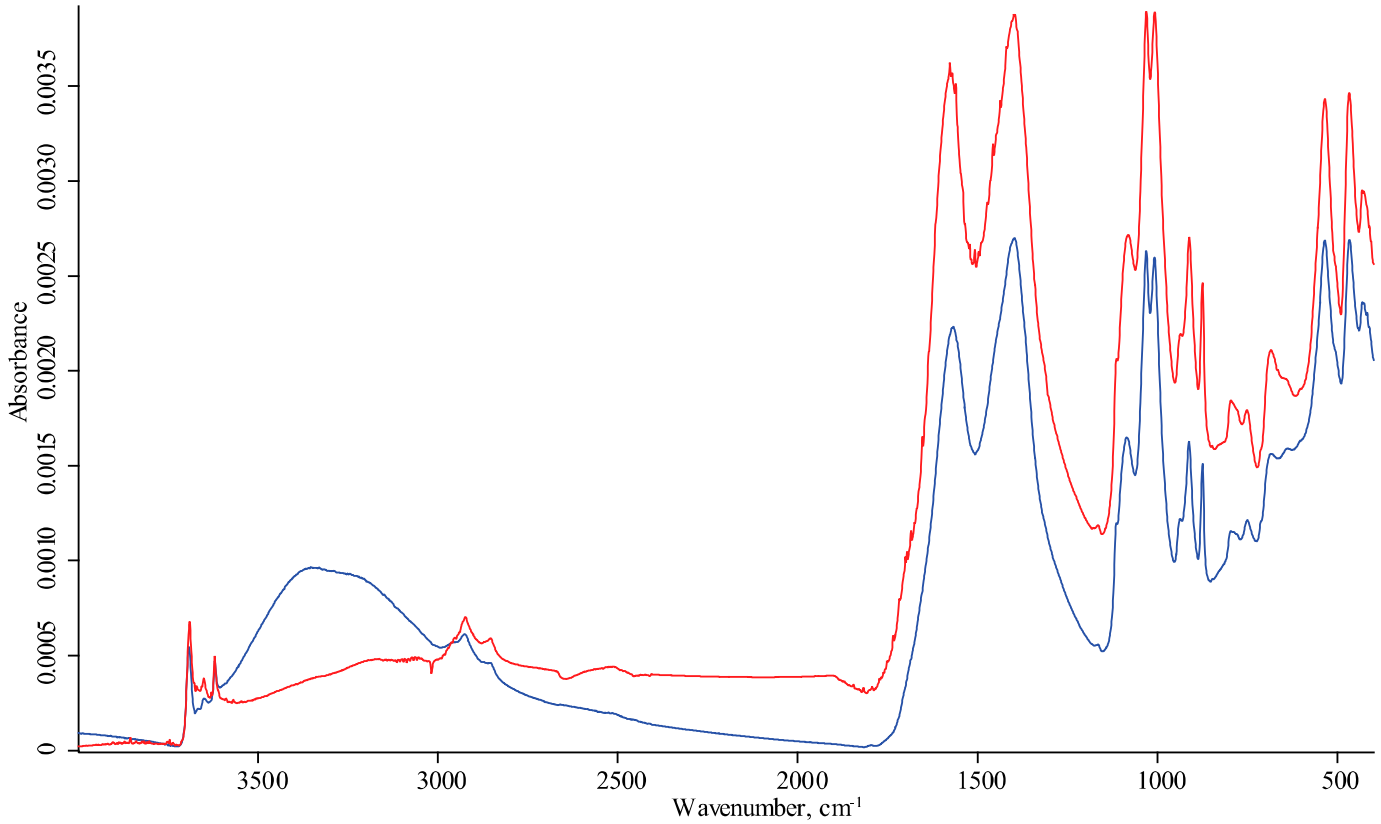

Figure S10. IR absorption spectra in the range 4000–400 cm^{-1} after ATR correction of the Sigma-Aldrich sample before heating at 25 °C (blue line) and after heating to 215 °C and cooling to 25 °C (red line).

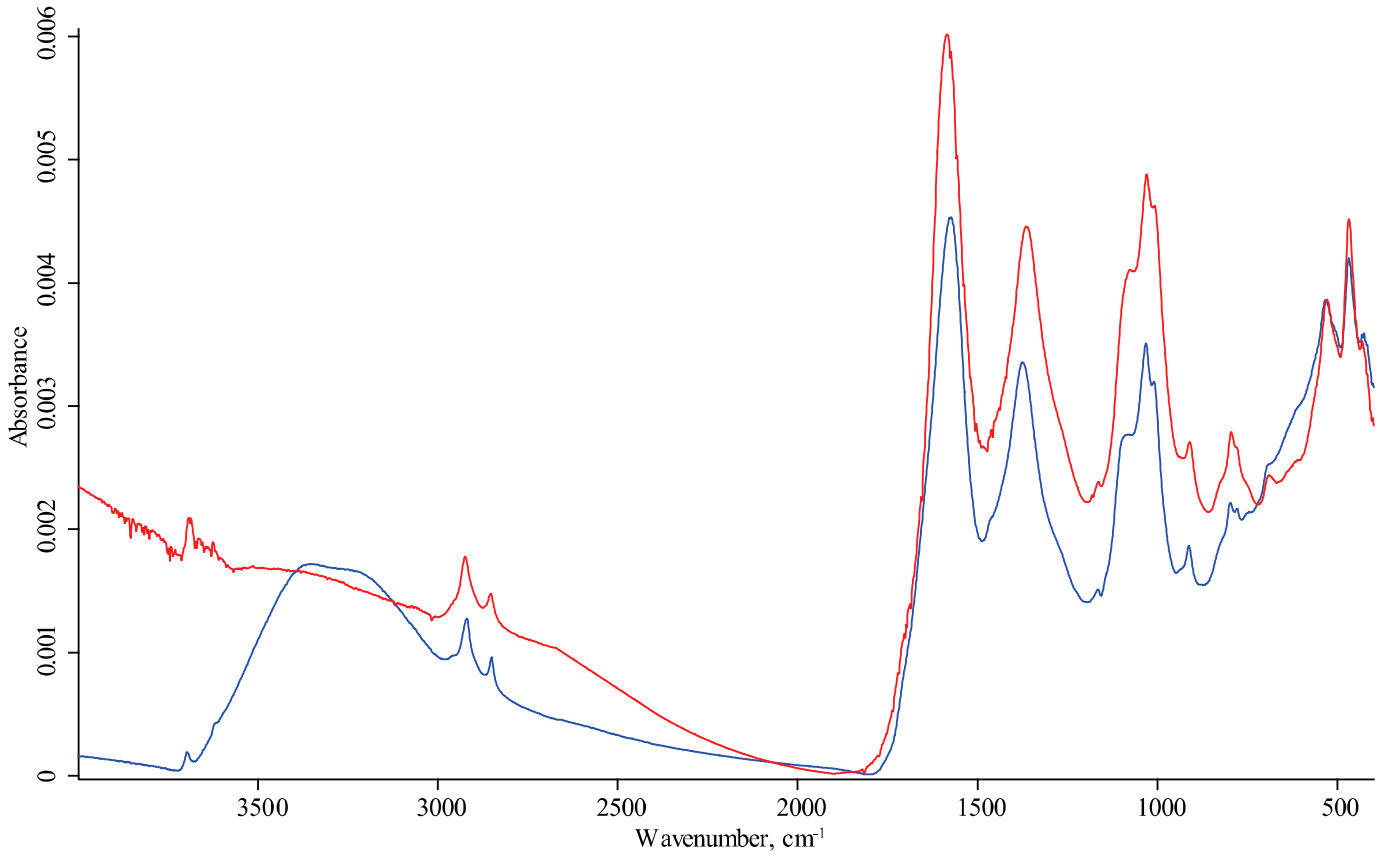

Figure S11. IR absorption spectra in the range 4000–400 cm^{-1} after ATR correction of the Sakhalin sample before heating at 25 °C (blue line) and after heating to 215 °C and cooling to 25 °C (red line).