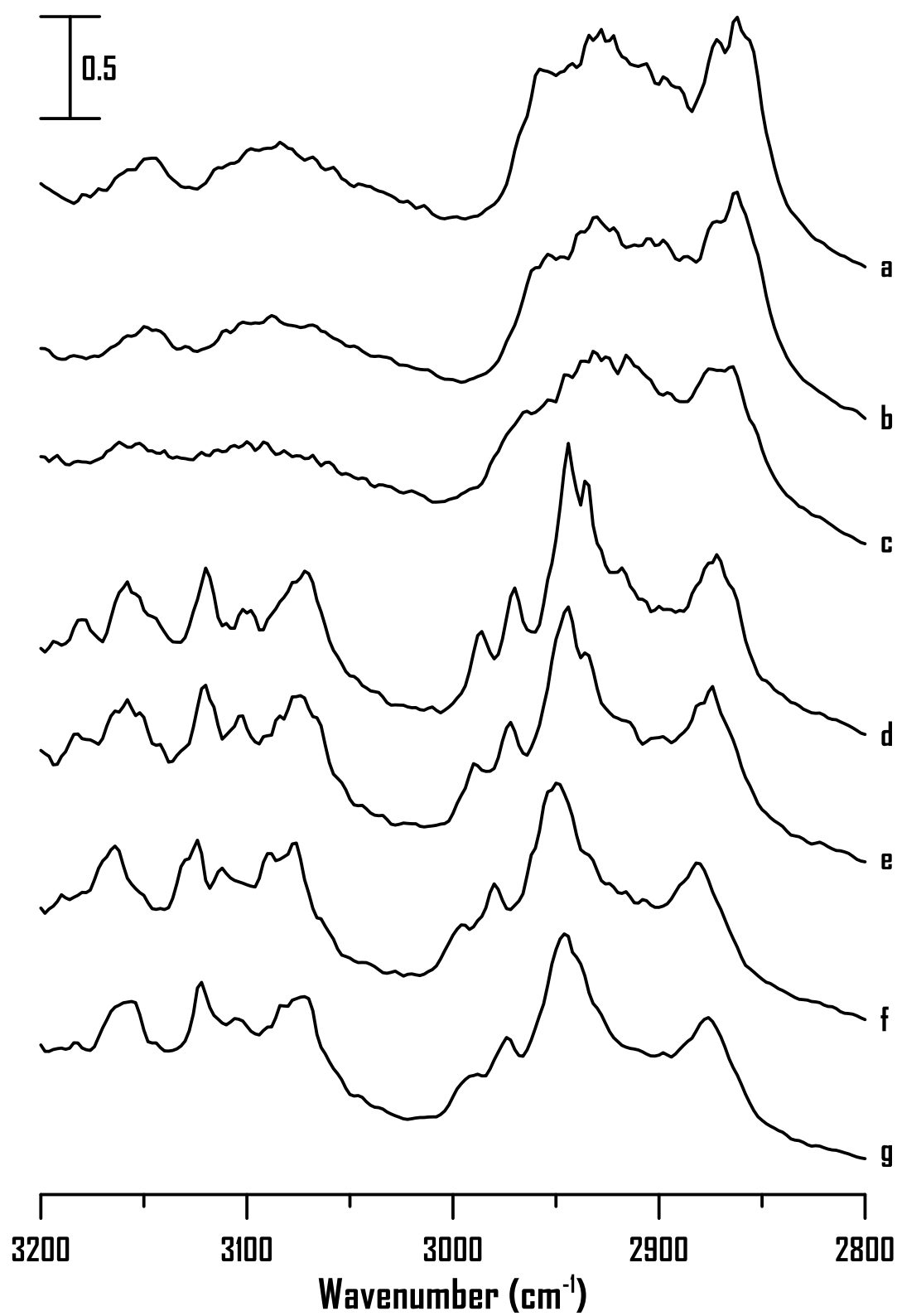
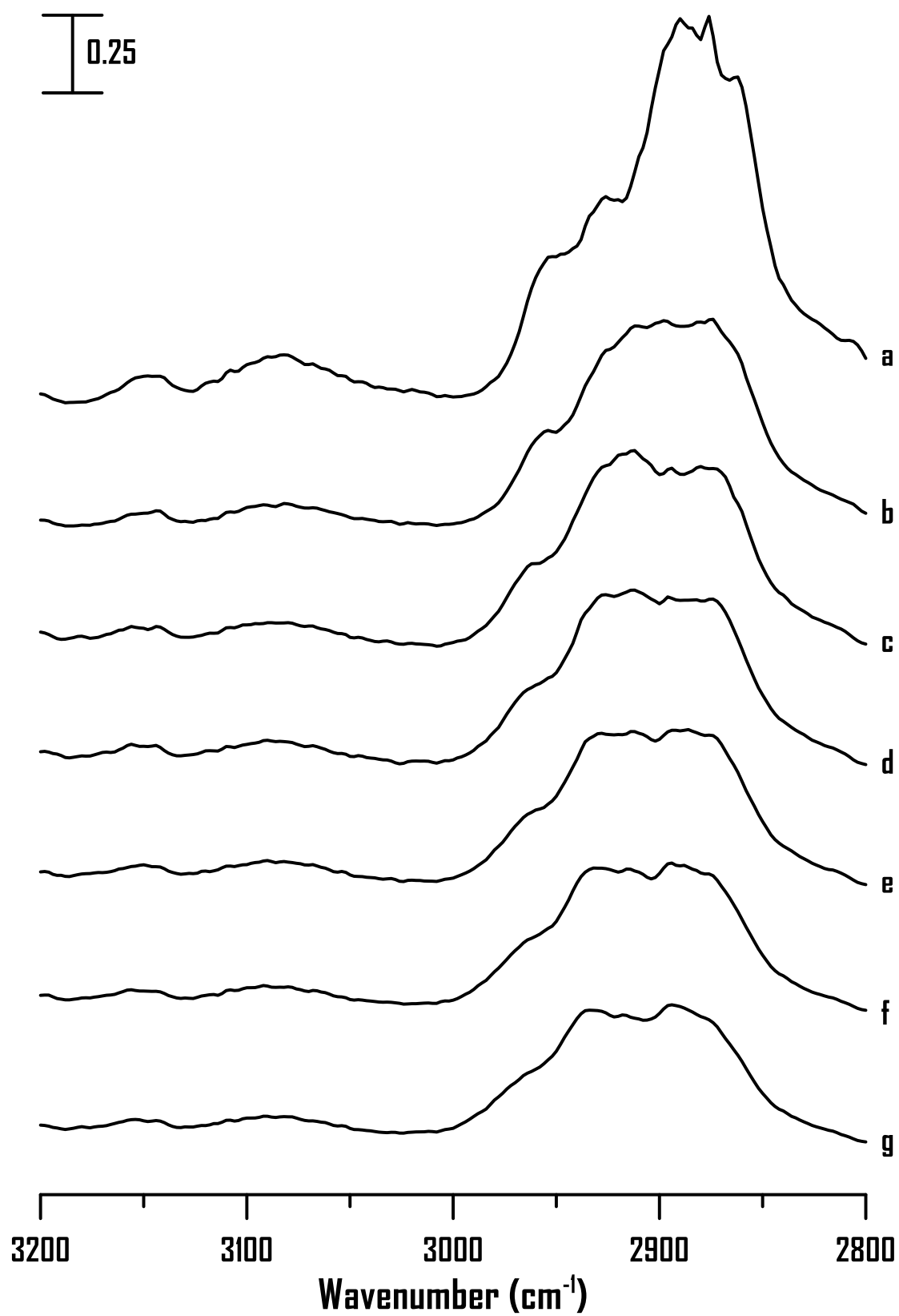


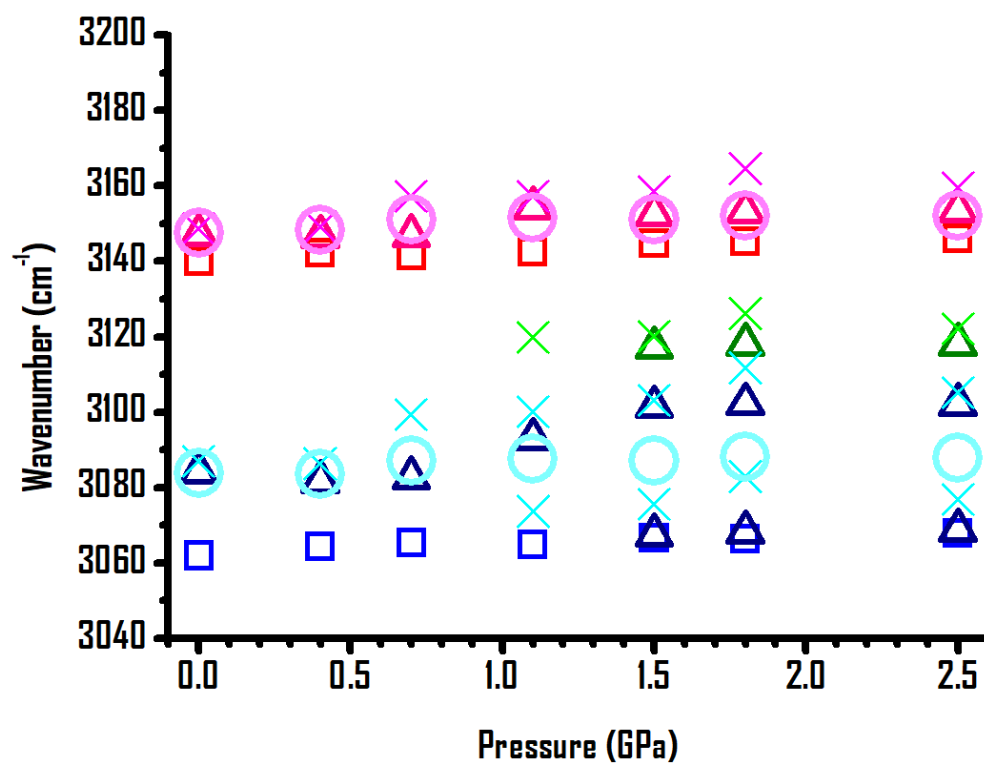
## Supplementary Materials



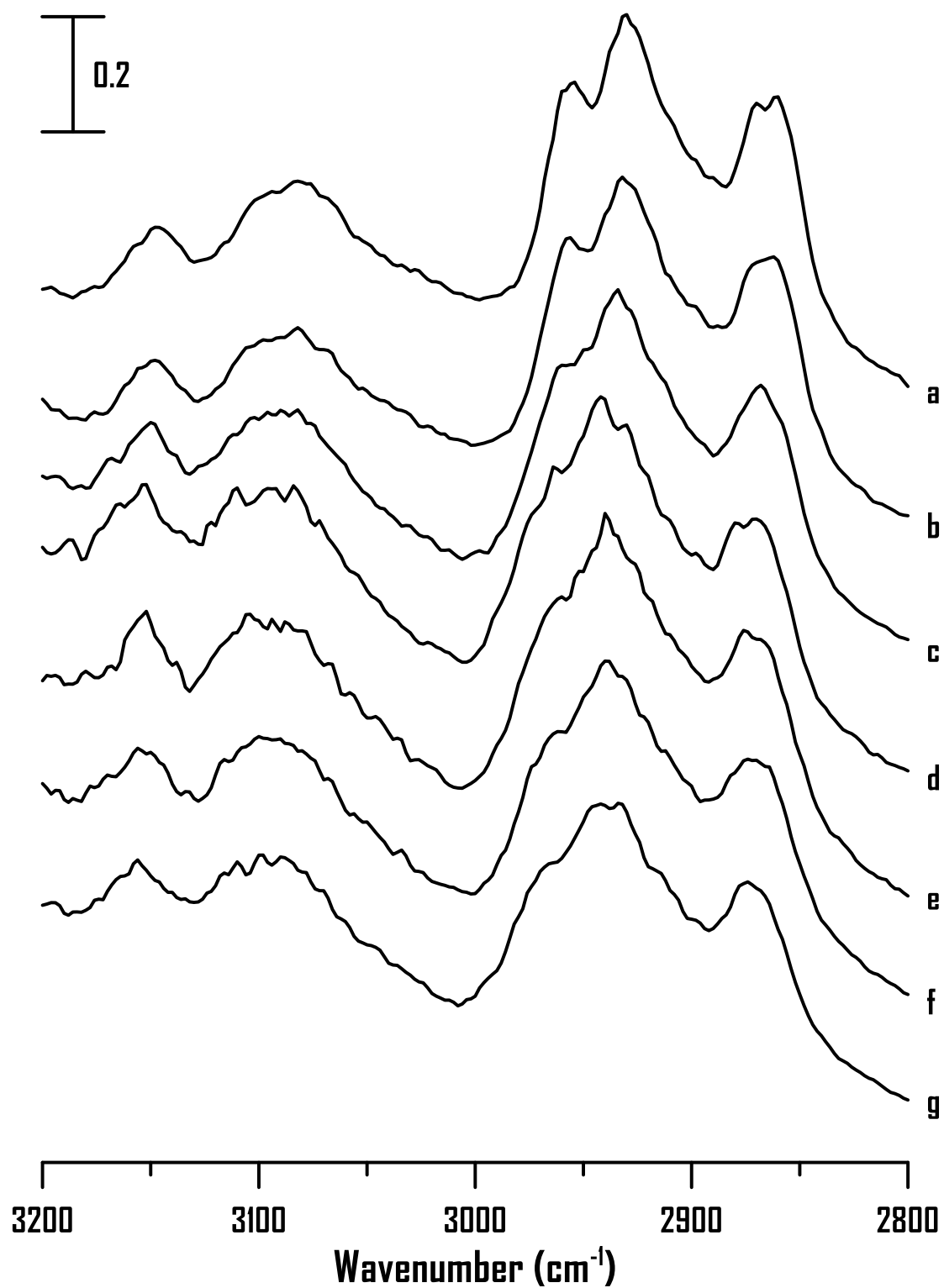
**Figure S1.** IR spectra of the [HMIM]Br-PEO mixture containing 75 wt% [HMIM]Br at (a) ambient pressure and (b) 0.4, (c) 0.7, (d) 1.1, (e) 1.5, (f) 1.8, and (g) 2.5 GPa.



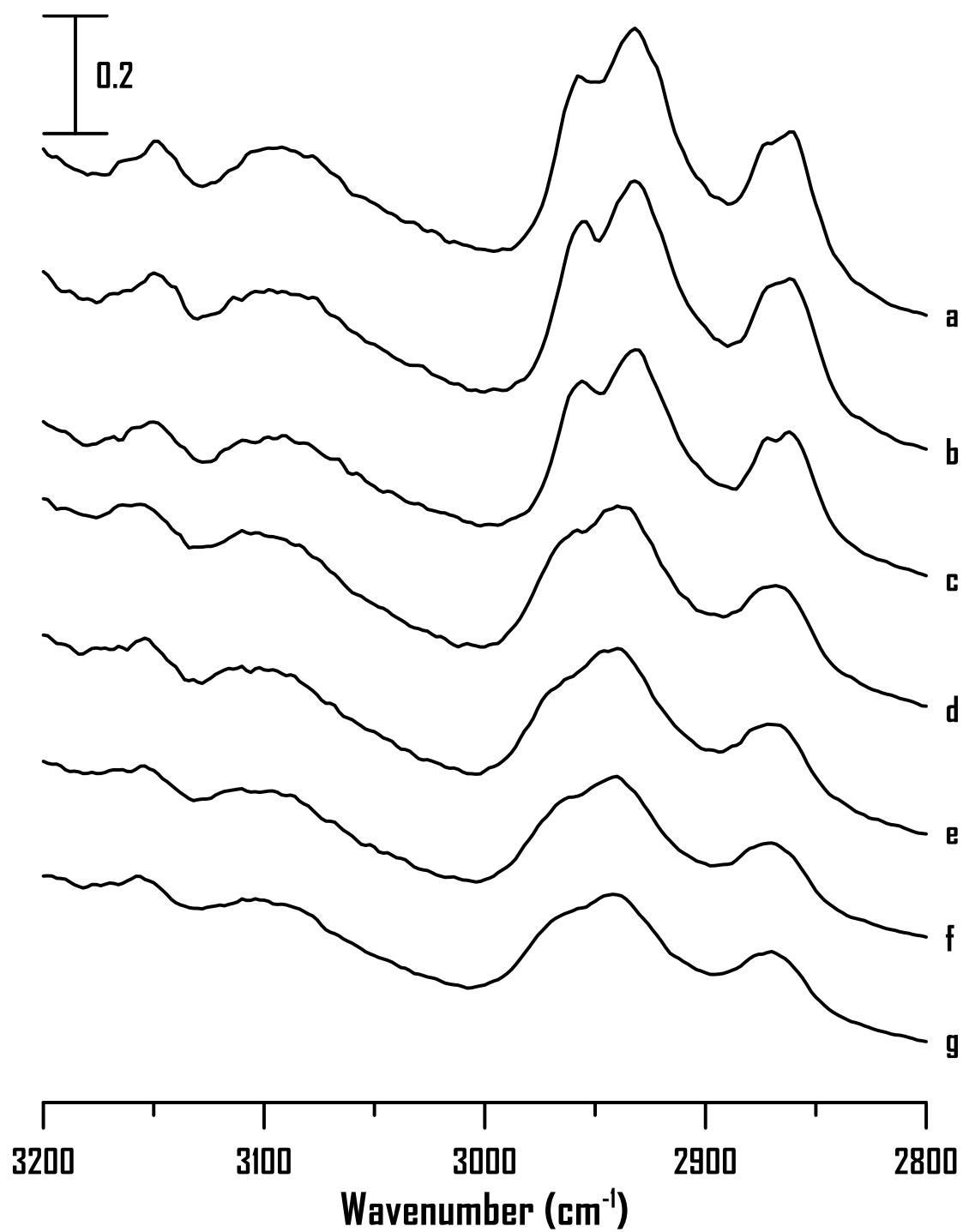
**Figure S2.** IR spectra of the [HMIM]Br-PEO mixture containing 50 wt% [HMIM]Br at (a) ambient pressure and (b) 0.4, (c) 0.7, (d) 1.1, (e) 1.5, (f) 1.8, and (g) 2.5 GPa.



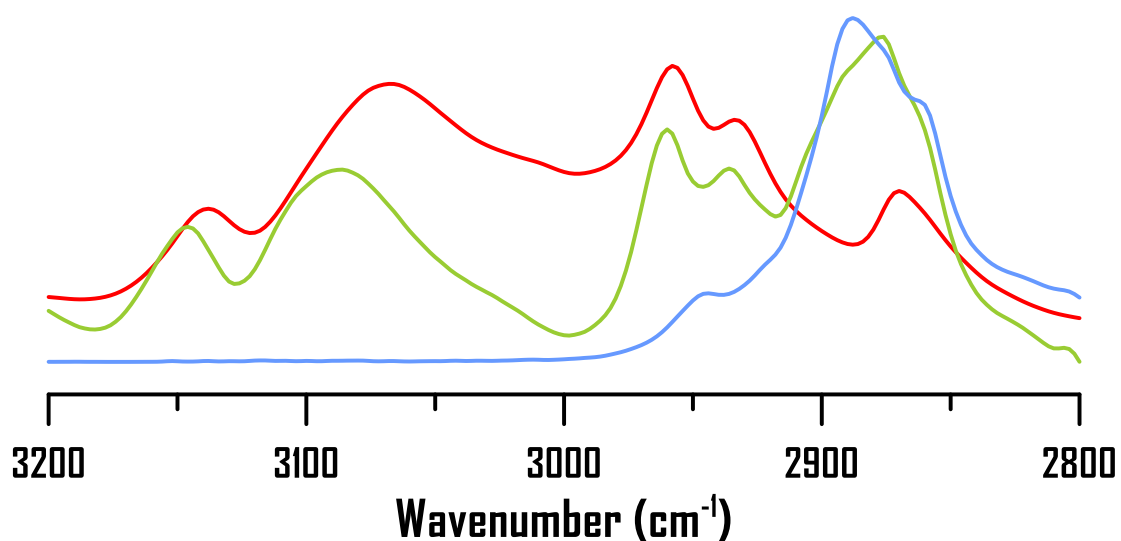
**Figure S3.** Pressure dependence of the C–H stretching frequencies of imidazolium C<sup>4,5</sup>–H and C<sup>2</sup>–H of pure [HMIM]Br (squares) and [HMIM]Br-PEO mixtures with 80 wt% (triangles), 75 wt% (cross (X)), and 50 wt% (circle) [HMIM]Br.



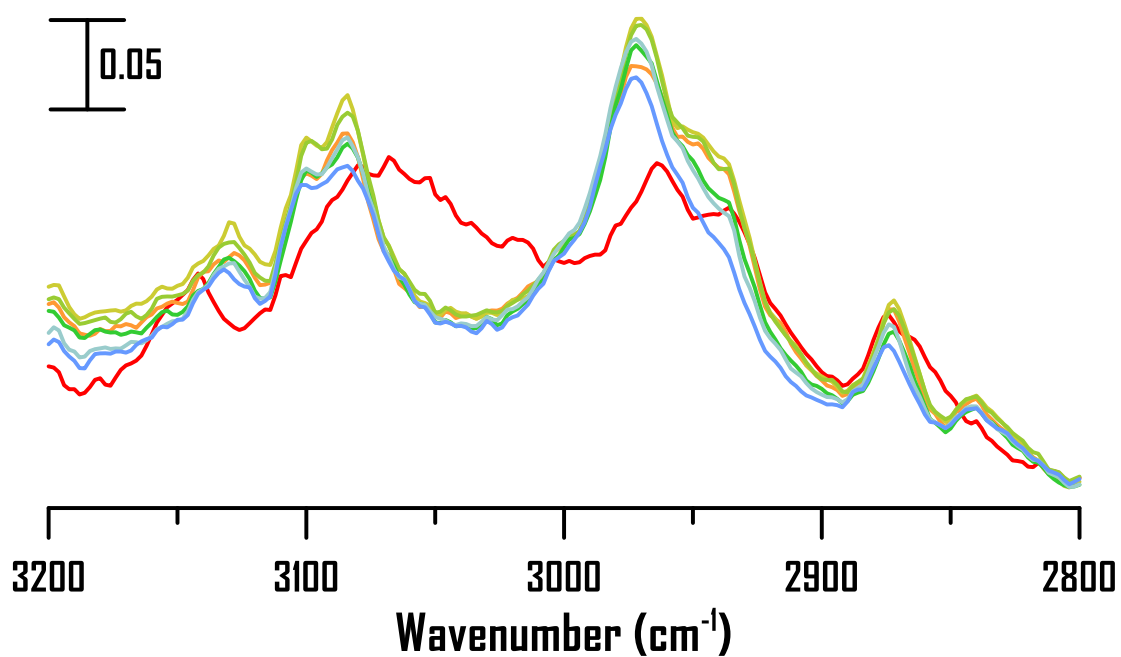
**Figure S4.** IR spectra of the [HMIM]Br-polyethylene glycol 1500 (PEO with low M.W.) mixture containing 80 wt% [HMIM]Br at (a) ambient pressure and (b) 0.4, (c) 0.7, (d) 1.1, (e) 1.5, (f) 1.8, and (g) 2.5 GPa.



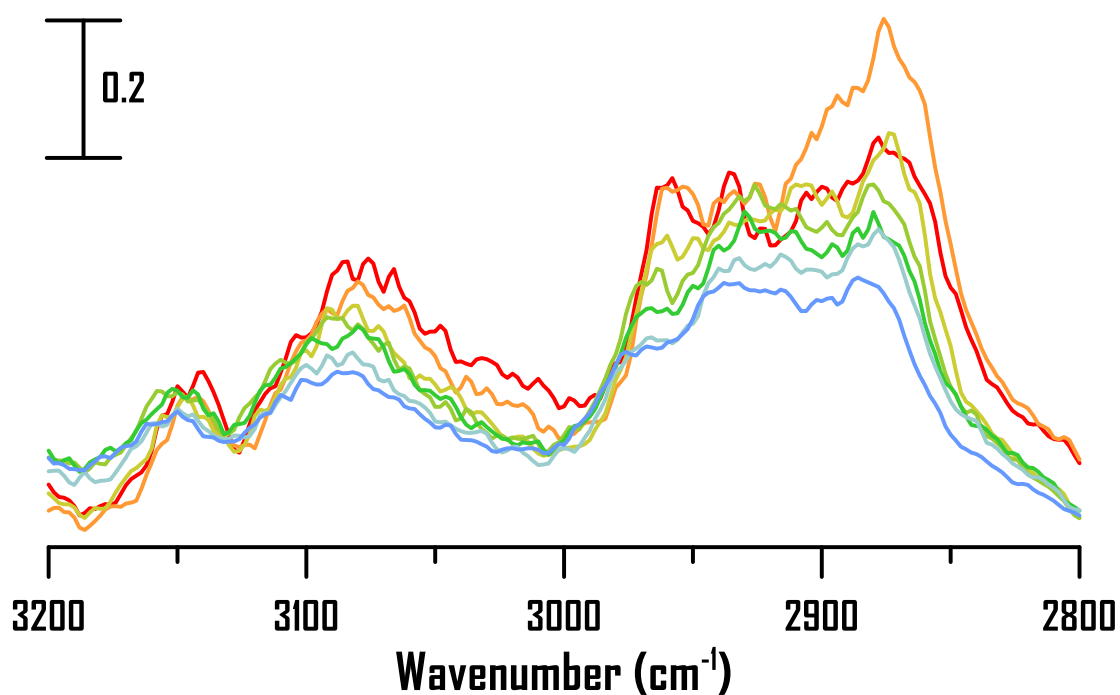
**Figure S5.** IR spectra of the [HMIM]Br-ethylene glycol mixture containing 80 wt% [HMIM]Br at (a) ambient pressure and (b) 0.4, (c) 0.7, (d) 1.1, (e) 1.5, (f) 1.8, and (g) 2.5 GPa.



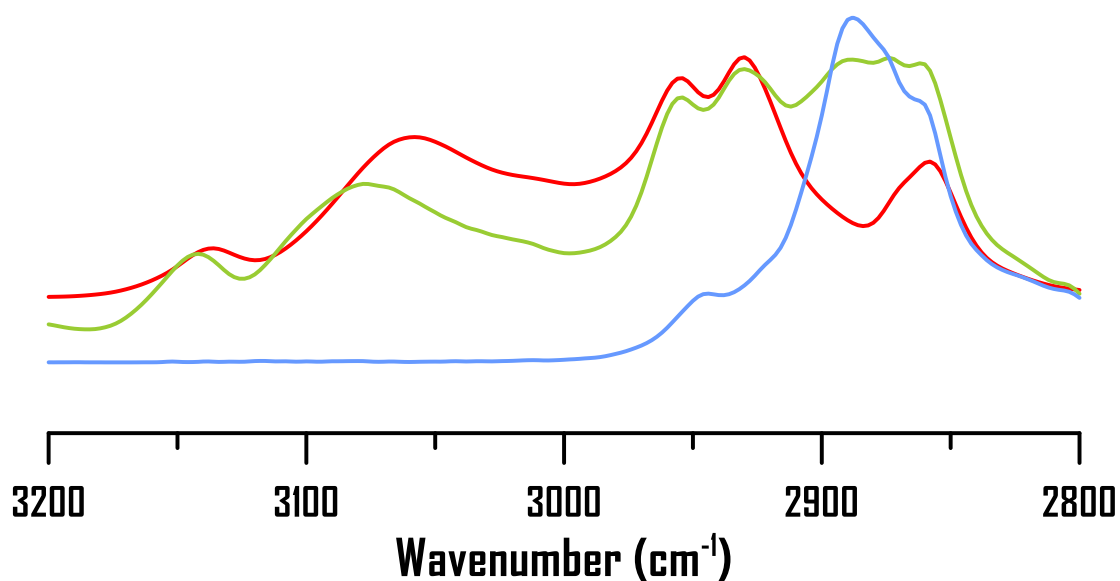
**Figure S6** (overlaid spectra in Figure 1). Infrared (IR) spectra of (red) pure [BMIM]Br, (Martian green) mixture of PEO containing 75 wt% [BMIM]Br, and (baby blue) pure PEO at ambient pressure.



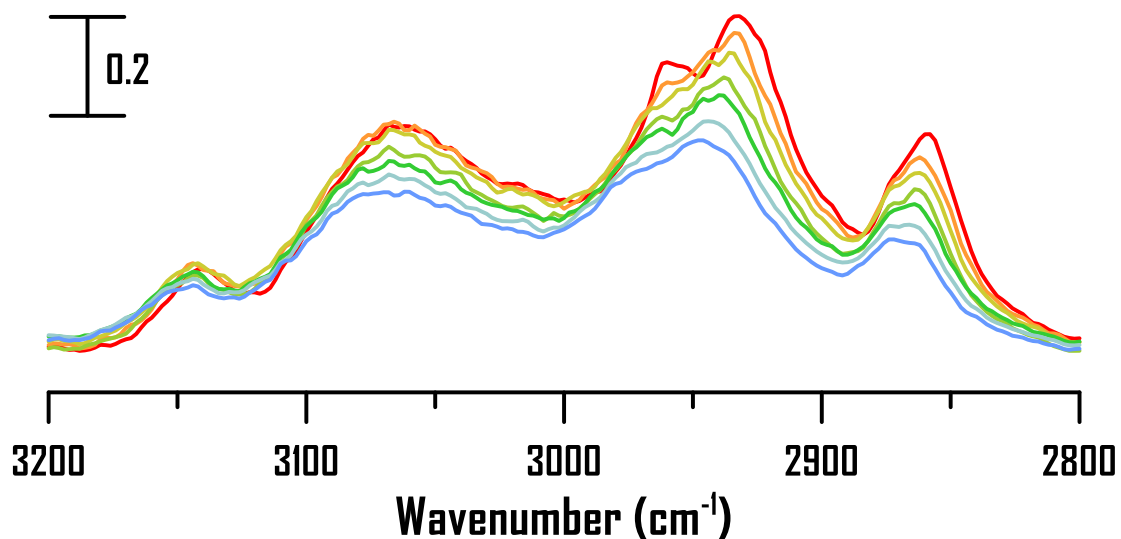
**Figure S7** (overlaid spectra in Figure 3). IR spectra of pure [BMIM]Br at (red) ambient pressure and (light orange) 0.4, (banana yellow) 0.7, (Martian green) 1.1, (spring green) 1.5, (light Bluegreen) 1.8, and (baby blue) 2.5 GPa.



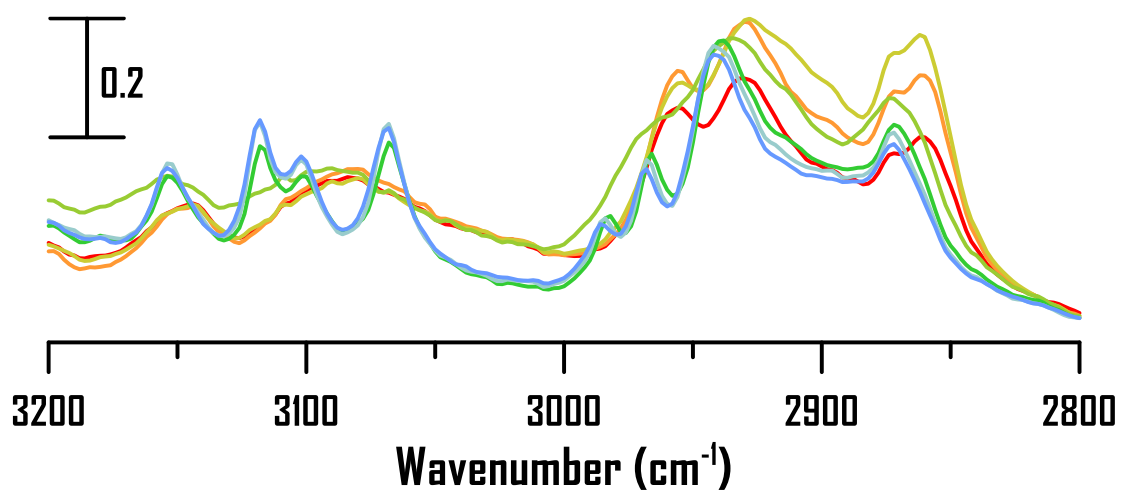
**Figure S8** (overlaid spectra in Figure 4). IR spectra of the [BMIM]Br-PEO mixture containing 80 wt% of [BMIM]Br at (red) ambient pressure and (light orange) 0.4, (banana yellow) 0.7, (Martian green) 1.1, (spring green) 1.5, (light Bluegreen) 1.8, and (baby blue) 2.5 GPa.



**Figure S9** (overlaid spectra in Figure 6). IR spectra of (red) pure [HMIM]Br, (Martian green) mixture of PEO containing 75 wt% [HMIM]Br, and (baby blue) pure PEO at ambient pressure.



**Figure S10** (overlaid spectra in Figure 8). IR spectra of pure [HMIM]Br at (red) ambient pressure and (light orange) 0.4, (banana yellow) 0.7, (Martian green) 1.1, (spring green) 1.5, (light Bluegreen) 1.8, and (baby blue) 2.5 GPa.



**Figure S11** (overlaid spectra in Figure 9). IR spectra of the [HMIM]Br-PEO mixture containing 80 wt% [HMIM]Br at (red) ambient pressure and (light orange) 0.4, (banana yellow) 0.7, (Martian green) 1.1, (spring green) 1.5, (light Bluegreen) 1.8, and (baby blue) 2.5 GPa.