Supporting Information

The interactions are demonstrated in the Figure S1 (a) and (b), anions and water molecules were only demonstrated for a central cationic moiety in order to facilitate the visualization of interactions in [DBMIM][2Br][2H₂O].

![Figure S1](image)

**Figure S1.** Interactions among water, bromide and imidazolium ring in the crystalline structure of [DBMIM][2Br][2H₂O] performed by Diamond Crystal and Molecular Structure visualization. ¹

![Figure S2](image)

**Figure S2.** (a) C-H interactions between two cationic moieties and (b) C-H⋯π interactions between two cationic moieties performed by Diamond Crystal and Molecular Structure visualization. ¹

In the Figure S3(a) is showed the PVD of dication and at Figure S3(b) is showed the PVD of each anion that are around the dication for [DBMIM][2BF₄]. The Figure S4 demonstrates the contact surface of dication and a specific anion.
Figure S3. (a) VDP for cation of [DBMIM][2BF₄]. (b) VDP for anions of IL [DBMIM][2BF₄] by TOPOS.²

Figure S4. Examples of contact surfaces between dication and anion of IL [DBMIM][2BF₄].²

Figure S5 (a) shows schematic representation of calculation to $G_{C1\cdots An}$ for cation/anion interaction in [DBMIM][2BF₄] and/or [DBMIM][2Br][2H₂O].

Figure S5. (b) Schematic representation of calculation to energy for water interactions with [DBMIM][2Br][2H₂O].
**Figure S6.** Graphic that demonstrate the interaction energy *versus* surface area in: (a) [DBMIM][2BF₄]. Eq. $y = -0.6163x - 30.158; r = 0.77$. (b) [DBMIM][2Br]•[2H₂O]. Eq. $y = y = -0.0544x + 1.6314; r = 0.46$.

**Figure S7.** Thermogram of [DBMIM][2BF₄] obtained by DSC.

**Figure S8.** Thermogram of [DBMIM][2Br]•[H₂O] obtained by DSC.
**Figure S9.** Analysis of amorphous percent by DSC for [DBMIM][2BF₄].

**Figure S10.** Analysis of amorphous percent by DSC for [DBMIM][2Br]·[H₂O].
Figure S11. Simulated x-ray powder diffraction of [DBMIM][BF₄].

Figure S12. Simulated x-ray powder diffraction of [DBMIM][Br]·[H₂O].
Figure S13. Termogravimetric analysis of [DBMIM][2Br]•[H₂O].

REFERENCES
