Speed of Sound in Ionic Liquids with a Common Ion at High Pressures

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The speed of sound was experimentally obtained for eight ionic liquids with a common anion or cation within (283.15–343.15) K and (0.1–95) MPa temperature and pressure ranges. The selected common anion was bis(trifluomethylsulfonyl)imide, whereas the common cation was 1-butyl-3-methylimidazolium. The experimental data together with those available in the literature show that changes in the structure of the anion have a much stronger influence over speed of sound than those in the cation. A clear inverse correlation between this magnitude and the ionic liquid molar mass was detected. The speed of sound derivatives against temperature and pressure were also determined; as compared with other liquids, quite small values were obtained, and no clear correlation against chemical nature of the ionic liquid was found.