

Densities, viscosities and conductivities of the
imidazolium ionic liquids [Emim][Ac],
[Emim][FAP], [Bmim][BETI], [Bmim][FSI],
[Hmim][TFSI], and [Omim][TFSI]

Supporting Information

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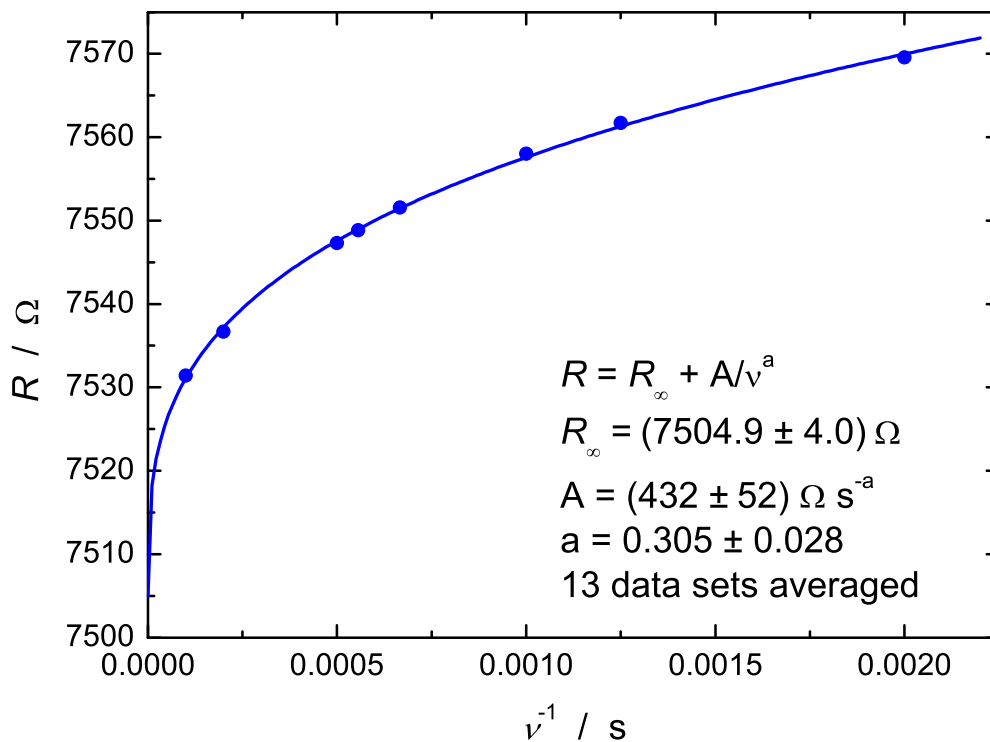


Figure S1. Averaged cell resistance, $R(\nu)$ (●; standard deviation of each data sample approximately equal to symbol size), as a function of reciprocal frequency, ν^{-1} , for [Omim][TFSI] at 338.15 K and corresponding fit (line) used to correct for electrode polarization.

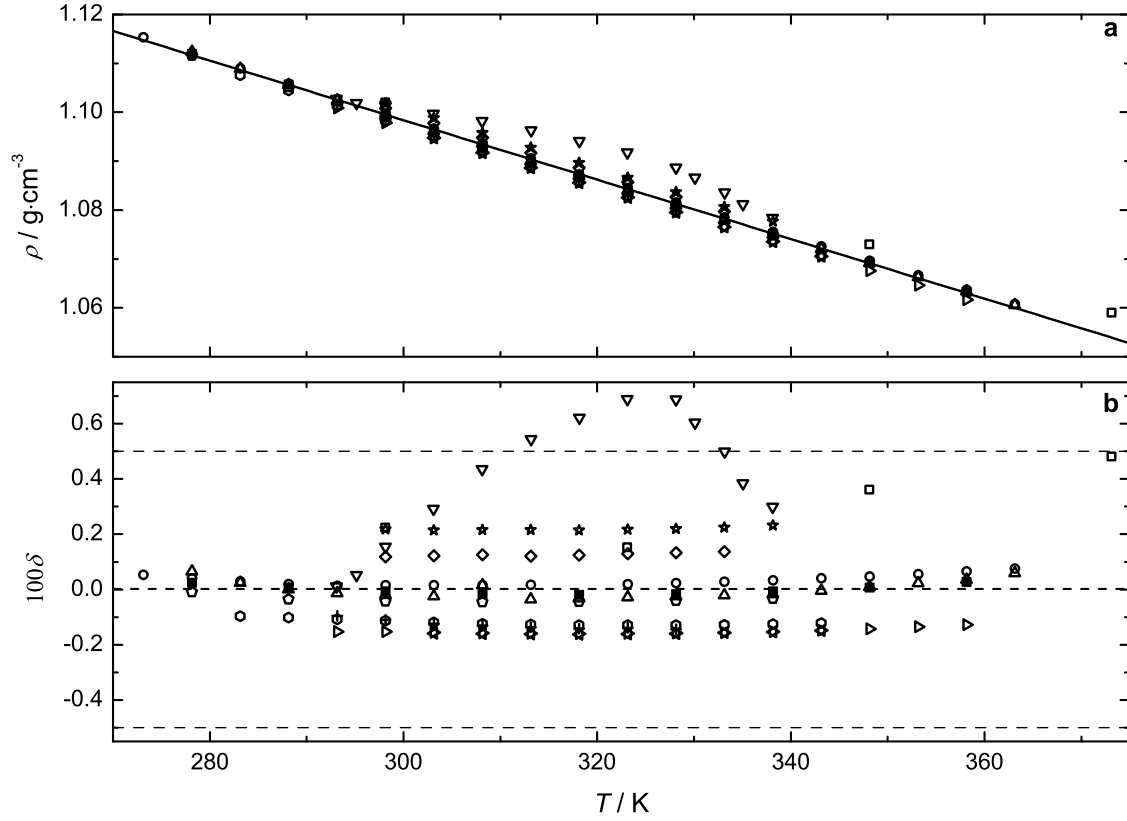


Figure S2. (a) Density, $\rho(T)$, of [Emim][Ac] from this study (■) and corresponding fit with eq 2 (solid line, for parameters see Table 6 of the main paper); (b) corresponding relative deviation, δ , from the fit. Also included are the data (a) and their deviation from the present fit (b) of Shiflett *et al.*¹ (□), Fröba *et al.*² (○), Freire *et al.*³ (△), Hou *et al.*⁴ (▽), Pereiro *et al.*⁵ (◇), Quijada-Maldonado *et al.*⁶ (◁), Rosenboom *et al.*⁷ (▷), Araujo *et al.*⁸ (⊙), Ma *et al.*⁹ (☆), Castro *et al.*¹⁰ (◊) and Rabari *et al.*¹¹ (+). In (b) the bold dashed line indicates $\delta = 0$, the thin dashed lines represent arbitrary margins of $100\delta = \pm 0.5$.

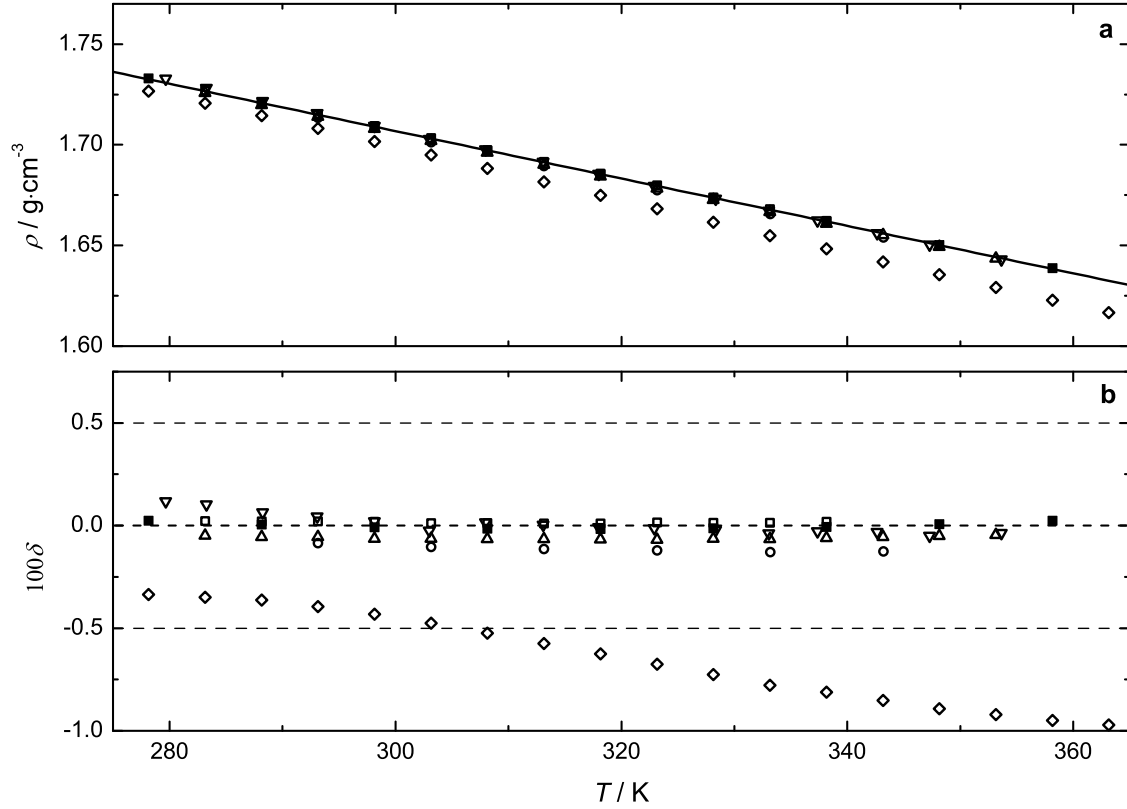


Figure S3. (a) Density, $\rho(T)$, of [Emin][FAP] from this study (■) and corresponding fit with eq 2 (solid line, for parameters see Table 6); (b) corresponding relative deviation, δ , from the fit. Also included in are the data (a) and deviations (b) of Liu *et al.*¹² (□), Almantariotis *et al.*¹³ (○), Seki *et al.*¹⁴ (△), Souckova *et al.*¹⁵ (▽) and Neves *et al.*¹⁶ (◇). In (b) the bold dashed line indicates $\delta = 0$, the thin dashed lines represent arbitrary margins of $100\delta = \pm 0.5$.

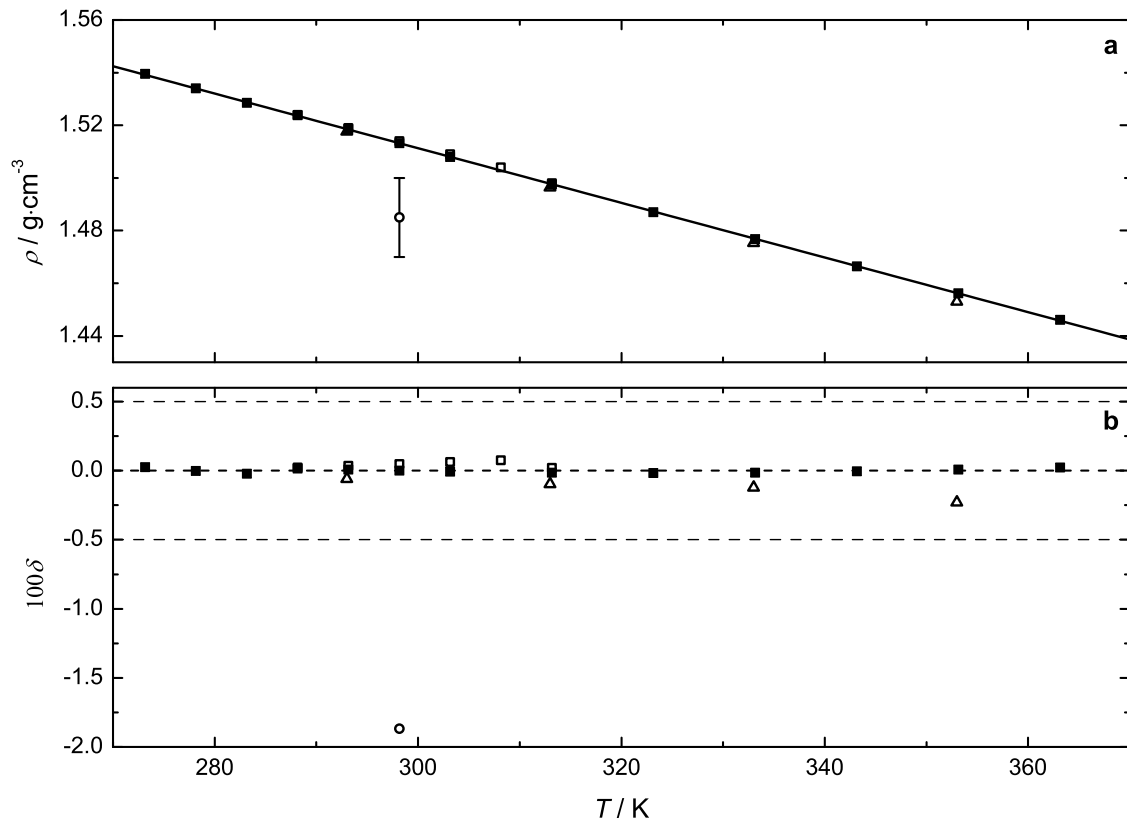


Figure S4. (a) Density, $\rho(T)$, of [Bmim][BETI] from this study (■) and corresponding fit with eq 2 (solid line, for parameters see Table 6); (b) corresponding relative deviation, δ , from the fit. Also included are the data (a) and their deviation from the present fit (b) of Tokuda *et al.*¹⁷ (□), Rollins *et al.*¹⁸ (○) and Liu *et al.*¹⁹ (△). In (b) the bold dashed line indicates $\delta = 0$, the thin dashed lines represent arbitrary margins of $100\delta = \pm 0.5$.

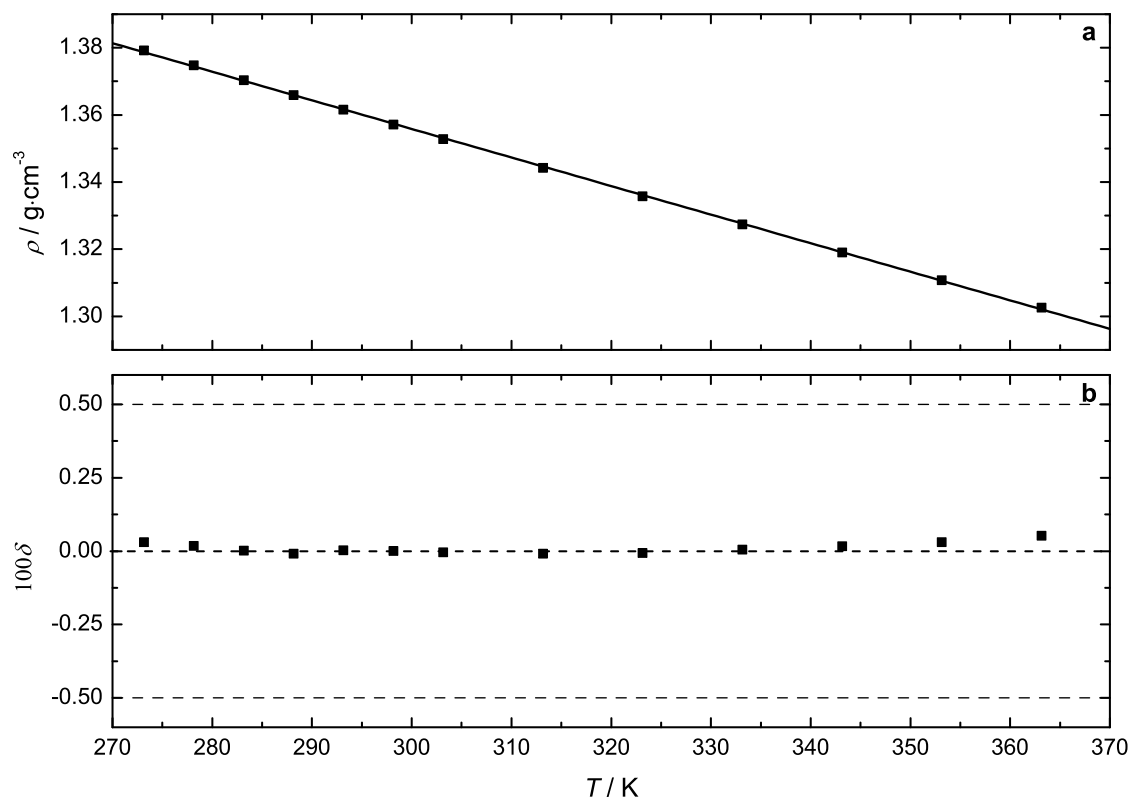


Figure S5. (a) Density, $\rho(T)$, of [Bmim][FSI] from this study (■) and corresponding fit with eq 2 (solid line, for parameters see Table 6); (b) corresponding relative deviation, δ , from the fit. In (b) the bold dashed line indicates $\delta = 0$, the thin dashed lines represent arbitrary margins of $100\delta = \pm 0.5$.

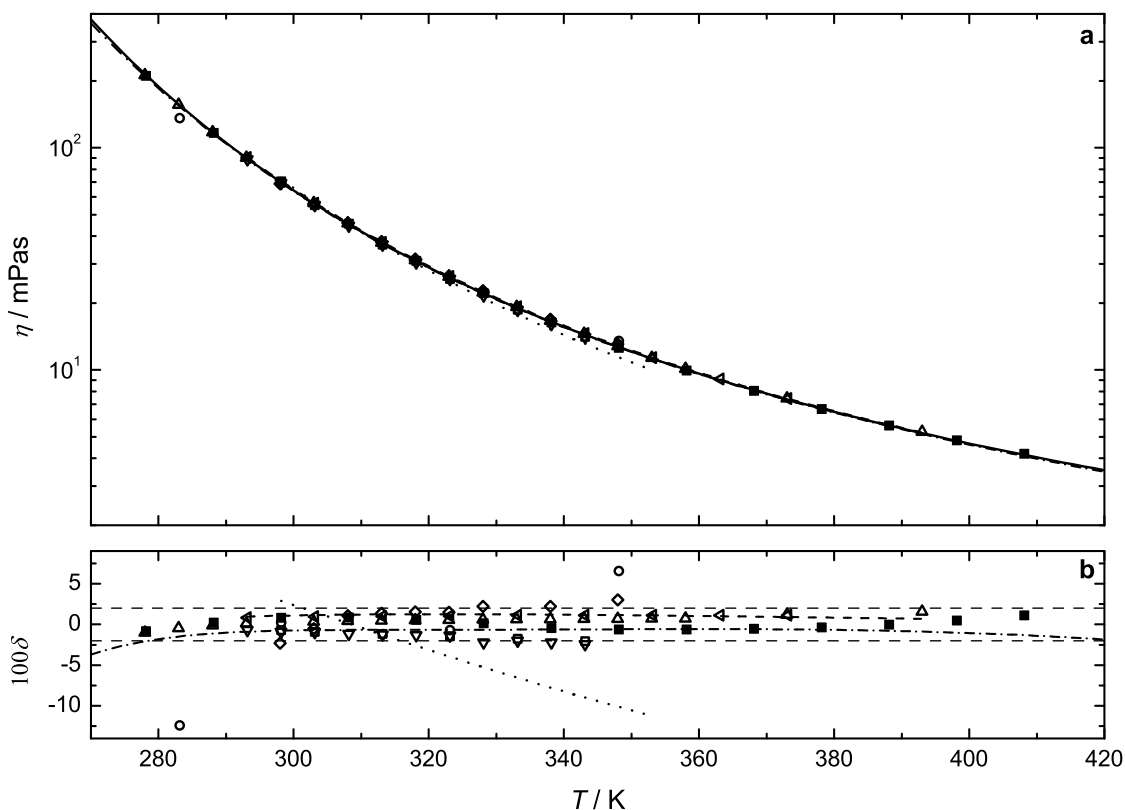


Figure S6. (a) Viscosity, η , of [Hmim][TFSI] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 7); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$. Also included are the data (a) and their deviation from the present fit (b) of Santos *et al.*²⁰ (□), Ahosseini *et al.*²¹ (○), Tariq *et al.*²² (△), Seoane *et al.*²³ (▽), Gangamallaiyah *et al.*²⁴ (◇) and Iguchi *et al.*²⁵ (◁). The dashed-dotted line is the IUPAC recommendation²⁶ for this ionic liquid; the dotted and the bold dashed lines represent the fit curves published by Rupp *et al.*²⁷ and Rocha *et al.*²⁸ respectively.

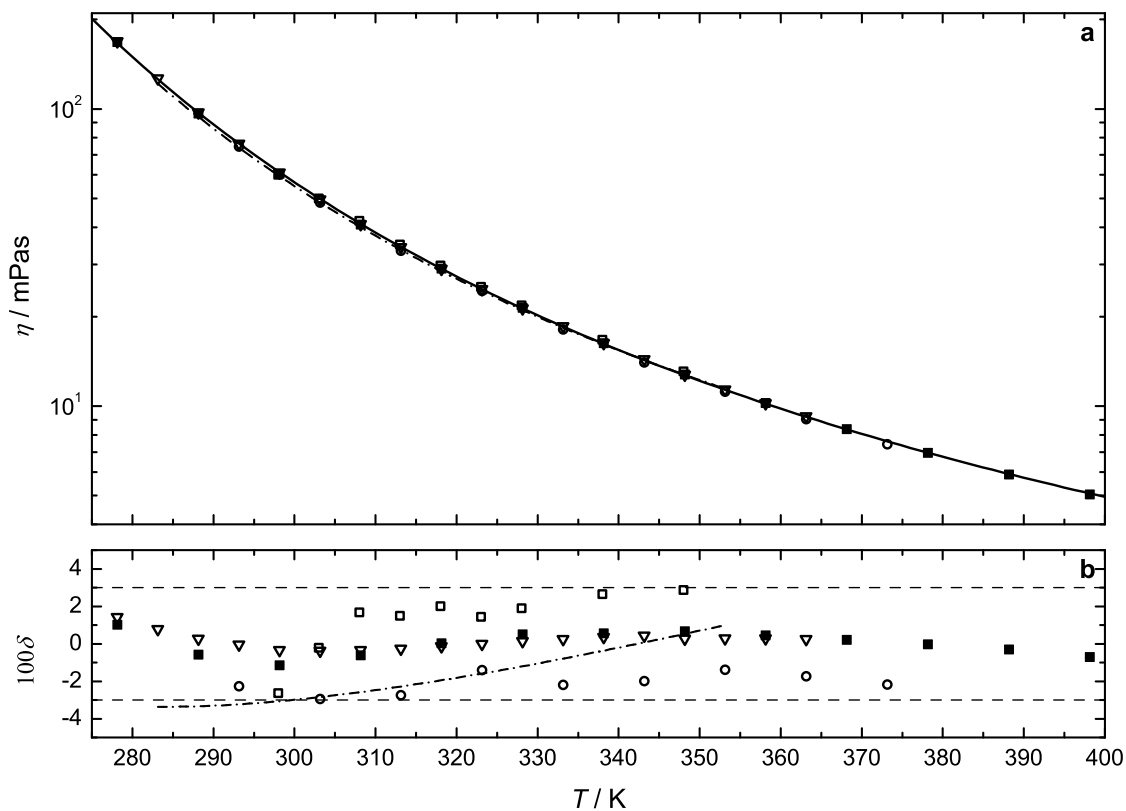


Figure S7. (a) Viscosity, η , of [Emim][FAP] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 7); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$. Also included are the data (a) and their deviation from the present fit (b) of Dutt²⁹ (□), Almantariotis *et al.*¹³ (○), Seki *et al.*³⁰ (△) and Neves *et al.*¹⁶ (▽). The dashed-dotted line represents the fit published by Seki *et al.*³⁰

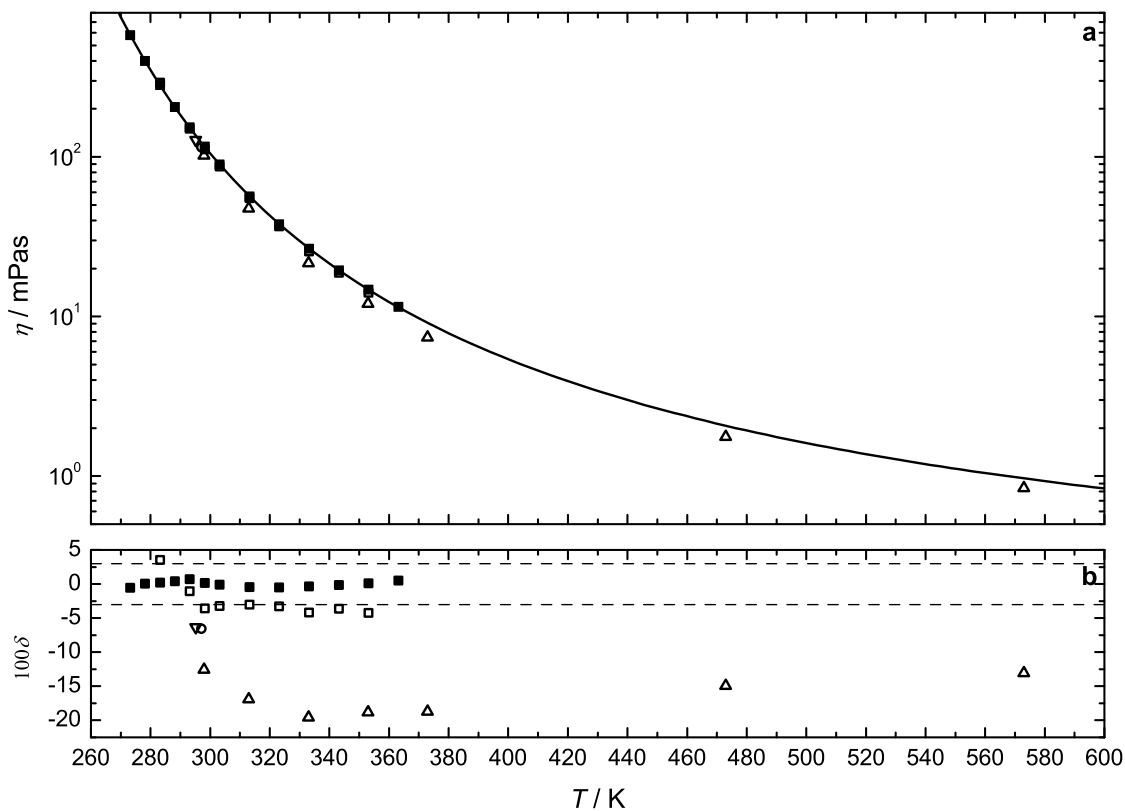


Figure S8. (a) Viscosity, η , of [Bmim][BETI] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 7); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$. Also included are the data (a) and their deviation from the present fit (b) of Tokuda *et al.*¹⁷ (□), Shirota *et al.*³¹ (○), Liu *et al.*¹⁹ (△) and Fox *et al.*³²

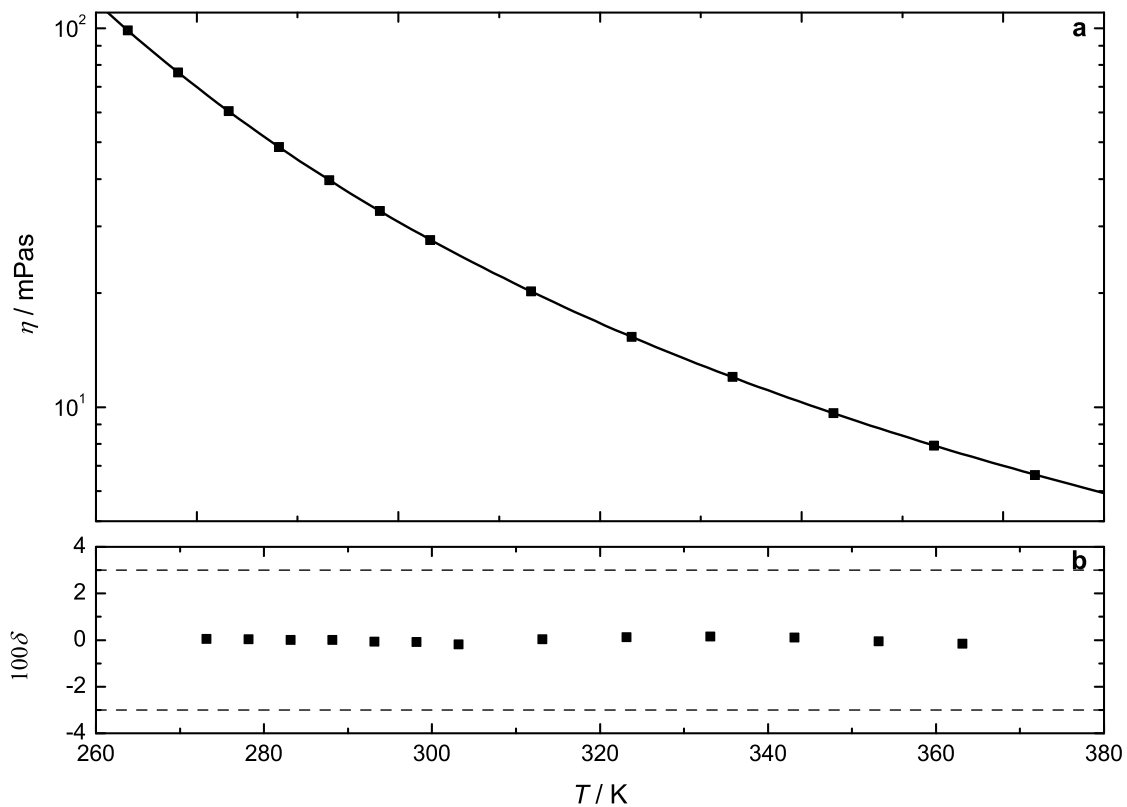


Figure S9. (a) Viscosity, η , of [Bmim][FSI] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 7); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$.

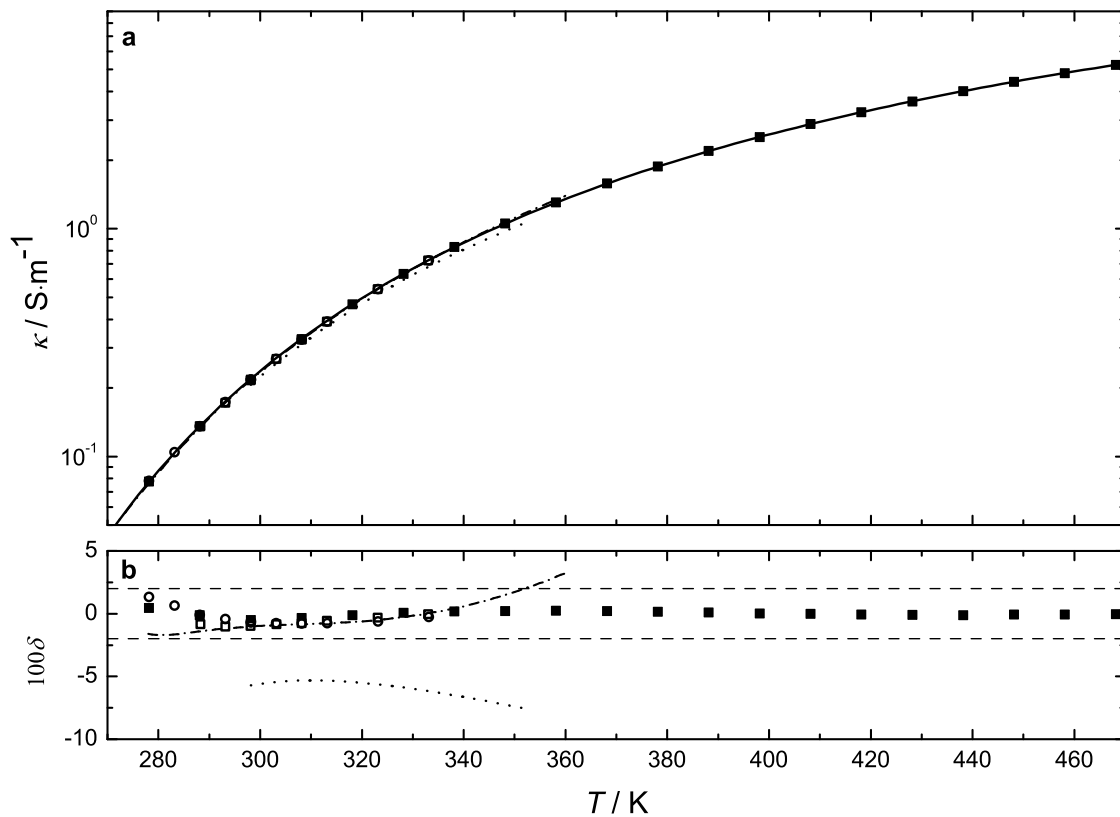


Figure S10. (a) Electrical conductivity, $\kappa(T)$, of [Hmim][TFSI] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 8); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 2$. Also included are the data (a) and their deviation from the present fit (b) of Calado *et al.*³³ (□) and Santos *et al.*²⁰ The dashed-dotted line is the IUPAC recommendation²⁶ for this ionic liquid; the dotted line represents the fit curve published by Rupp *et al.*²⁷

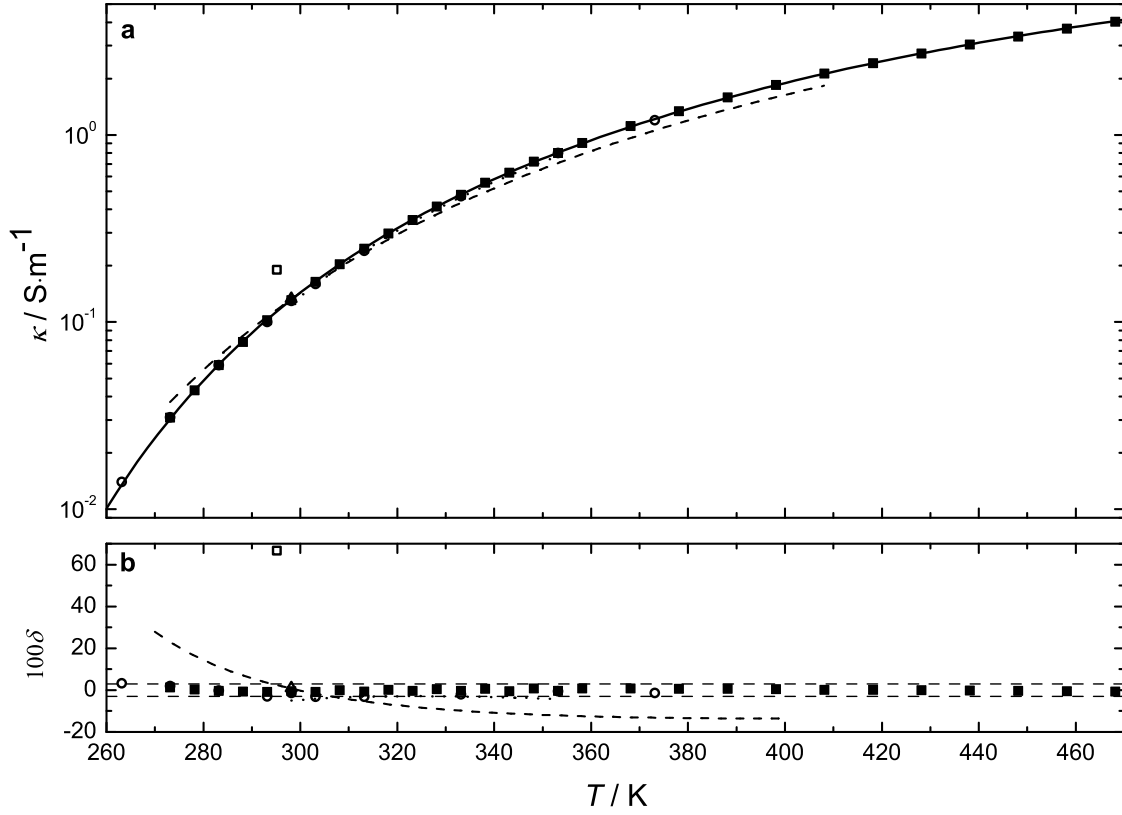


Figure S11. (a) Electrical conductivity, $\kappa(T)$, of [Omim][TFSI] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 8); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$. Also included are the data (a) and their deviation from the present fit (b) of Fitchett *et al.*³⁴ (□; δ outside the range shown in (b)), Tokuda *et al.*¹⁷ (○) and Yamaguchi *et al.*³⁵ (Δ). The dotted and the bold dashed lines represent the fit curve published by Rupp *et al.*²⁷ and Martinelli *et al.*³⁶ respectively.

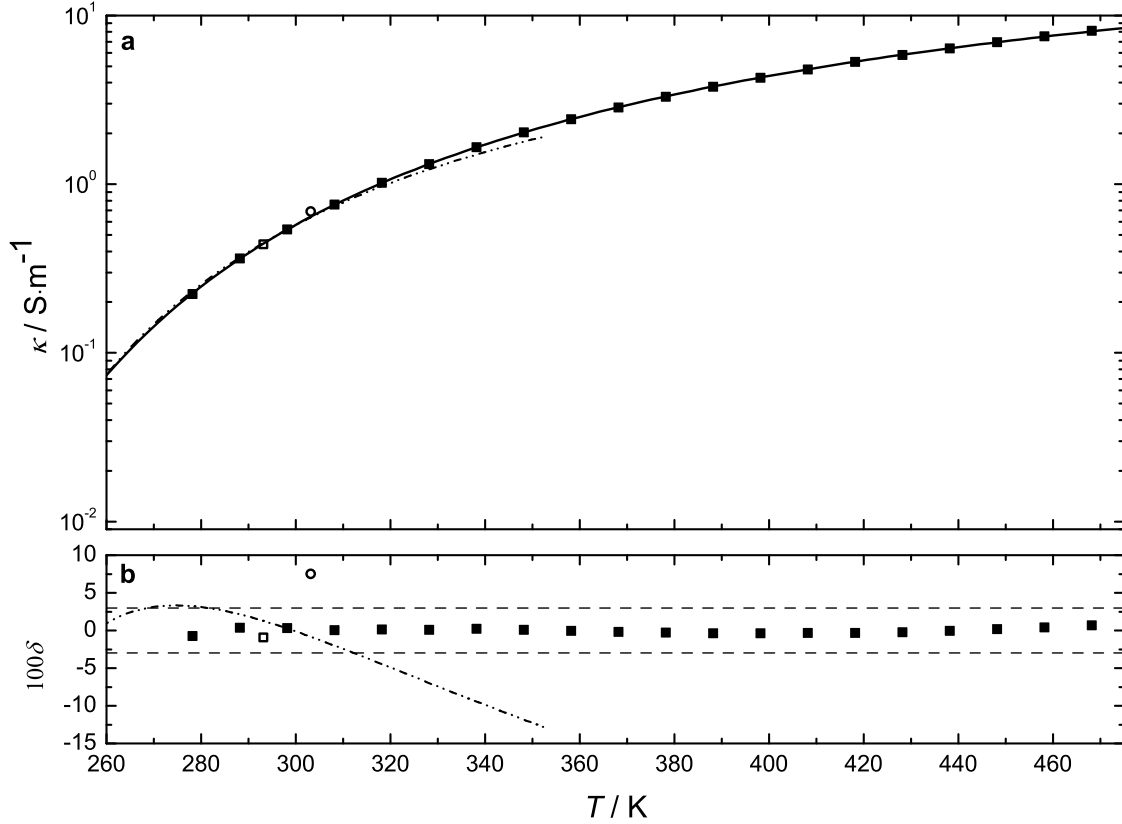


Figure S12. (a) Electrical conductivity, $\kappa(T)$, of [Emim][FAP] from this study (■) and corresponding fit with eq 3 (solid line, for parameters see Table 8); (b) corresponding relative deviation, δ , from the fit. In (b) the thin dashed lines represent arbitrary margins of $100\delta = \pm 3$. Also included are the data (a) and their deviation from the present fit (b) of Ignatev *et al.*³⁷ (□) and Seki *et al.*³⁰ (○). The dashed-dotted line represents the fit curve published by Seki *et al.*³⁰

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