The thermal behavior, glass transition temperatures, crystallization, melting temperatures, enthalpies and entropies of isotropization, of ionic liquids (ILs) of the 1-benzyl-3-methylimidazolium family, [BzC1im]+, with five different anions: chlorine; tetrafluoroborate; hexafluorophosphate; 1,1,2,2-tetrafluoroethanesulfonate and bis(trifluoromethylsulfonyl)imide, are presented. Heat capacities of the condensed phases were measured by continuous and step method in the temperature interval from 258 K to 358 K by Tian-Calvet microcalorimeter and, at $T=298.15\,\text{K}$, by the drop calorimeter. By comparison with the CnC1im+ IL series, the obtained results give insights into the anion character and topology and the understanding of the benzyl group contribution to the thermophysical properties of ionic liquids.

Acknowledgements

Thanks are due to Fundação para a Ciência e Tecnologia (FCT), Lisbon, Portugal and to European Social Fund for financial support to Centro de Investigação em Química, University of Porto (strategic project PEst-C/QUI/UI0081/2011). Marisa A.A. Rocha acknowledges the financial support from FCT and the European Social Fund (ESF) under the Community Support Framework (CSF) for the award of a Research Grant SFRH/BD/60513/2009. Paulo B.P. Serra acknowledges financial support from specific university research (MSMT No. 20/2014). Filipe M.S. Ribeiro acknowledges the financial support from FCT and the European Social Fund (ESF) under the Community Support Framework (CSF) for the award of a Research Grant SFRH/BD/94211/2013.