Supporting Information

Network Former Mixing (NFM) Effects in Alkali Germanotellurite Glasses.

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Table S1 – Nominal chemical compositions (nom.) of the $(A_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ (A = Li, Na) glass samples and those measured by ICP-OES, XRF and EDS. TeO_2 and GeO_2 contents determined by XRF and EDS for the A = Li glasses were normalized assuming the respective Li_2O contents from ICP-OES or the nominal ones when the latter method was not applied. All the values are given in mass percent (m%). The errors are 0.5, 1 and 2 m% for ICP-OES, XRF and EDS respectively.

Composition		m%(A_2O)				m%(TeO_2)			m%(GeO_2)		
		nom.	XRF	EDS	ICP-OES	nom.	XRF	EDS	Nom.	XRF	EDS
A = Li	*x* = 0.0	10.9	-	-	11.1	0.0	0.0	0.0	89.1	90.0	90.0
	x = 0.2	10.0	-	-	n.A.	24.9	23.4	25.1	65.2	67.6	65.8
	x = 0.4	9.2	-	-	9.7	45.8	44.4	46.7	45.0	46.8	44.4
	x = 0.5	8.8	-	-	n.A.	55.1	54.4	57.1	36.1	37.5	34.8
	x = 0.6	8.5	-	-	7.9	63.7	63.8	65.1	27.8	28.8	27.5
	x = 0.8	7.9	-	-	n.A.	79.1	78.9	79.5	13.0	13.7	13.1
	x = 1.0	7.4	-	-	7.1	92.6	93.3	93.3	0.0	0.0	0.0
A = Na	*x* = 0.0	20.2	n.A.	14.6	-	0.0	n.A.	0.0	79.8	n.A.	85.4
	x = 0.2	18.7	13.4	15.3	-	22.4	22.0	22.7	58.9	64.6	62.1
	x = 0.4	17.3	14.1	14.2	-	41.7	43.9	42.4	41.0	42.0	43.4
	x = 0.5	16.7	15.1	n.A.	-	50.3	46.7	n.A.	33.0	38.2	n.A.
	x = 0.6	16.2	13.5	12.2	-	58.3	61.0	62.2	25.5	25.5	25.7
	x = 0.8	15.2	11.6	16.2	-	72.9	78.6	74.2	11.9	9.8	9.6
	x = 1.0	14.3	12.3	12.4	-	85.7	87.7	87.5	0.0	0.0	0.0

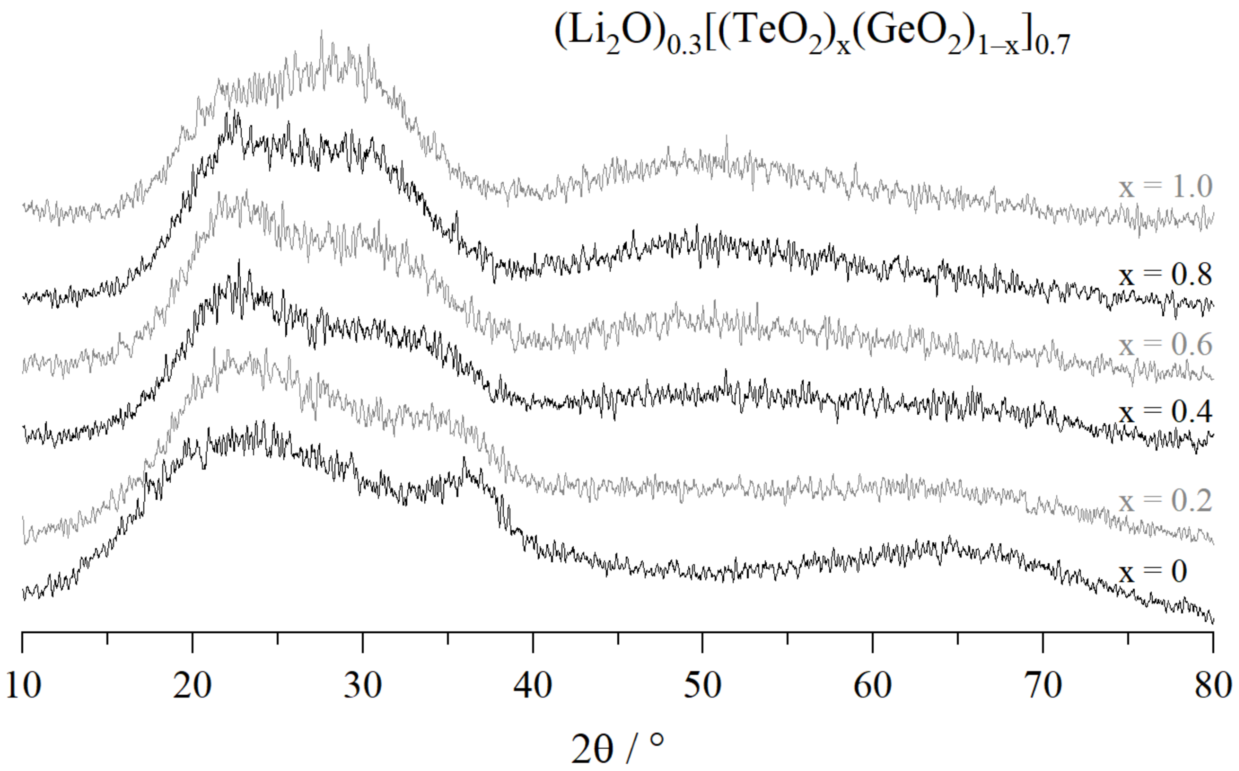


Figure S1: Powder X-ray diffractograms of $(Li_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ glasses.

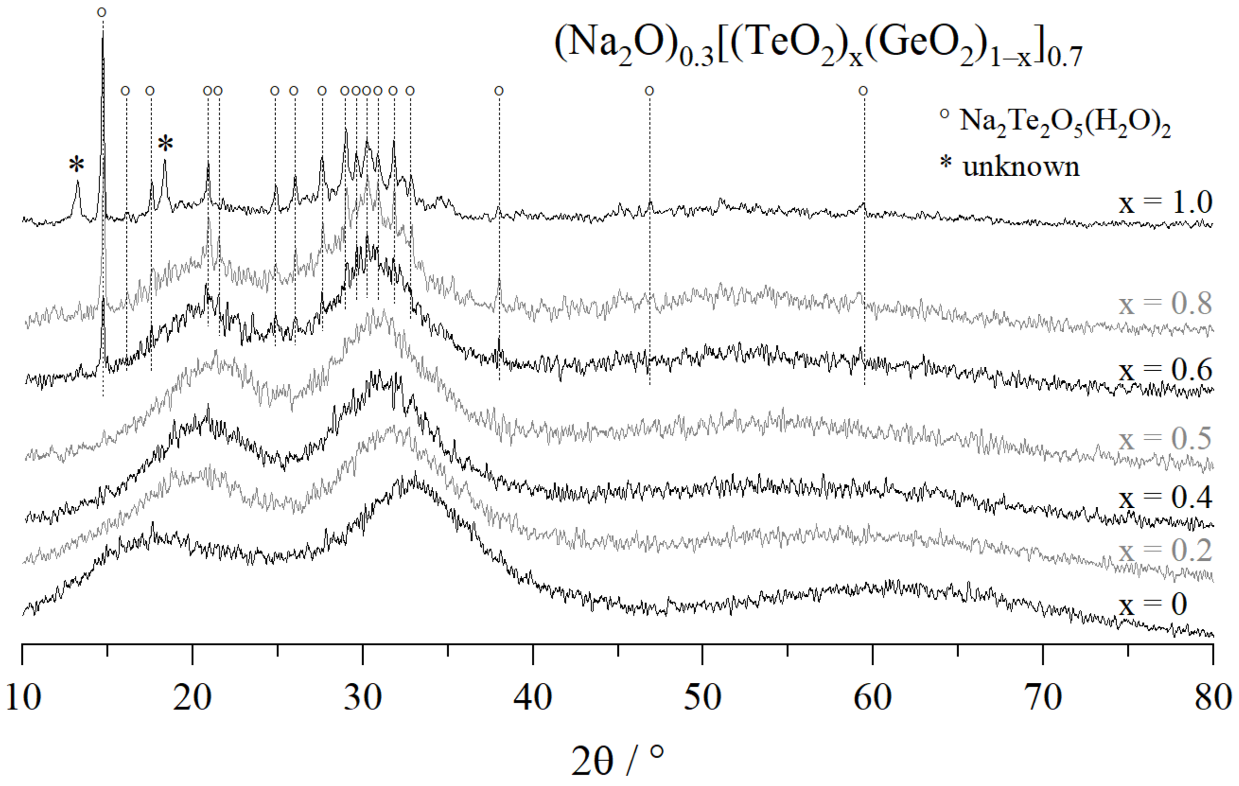


Figure S2: Powder X-ray diffractograms of $(Na_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ glasses. Asterisks, circles, and dashed vertical lines indicate diffraction bands attributable to crystalline phases found with help of the Qualx2 software[1] using the crystallography open database (COD).[2]

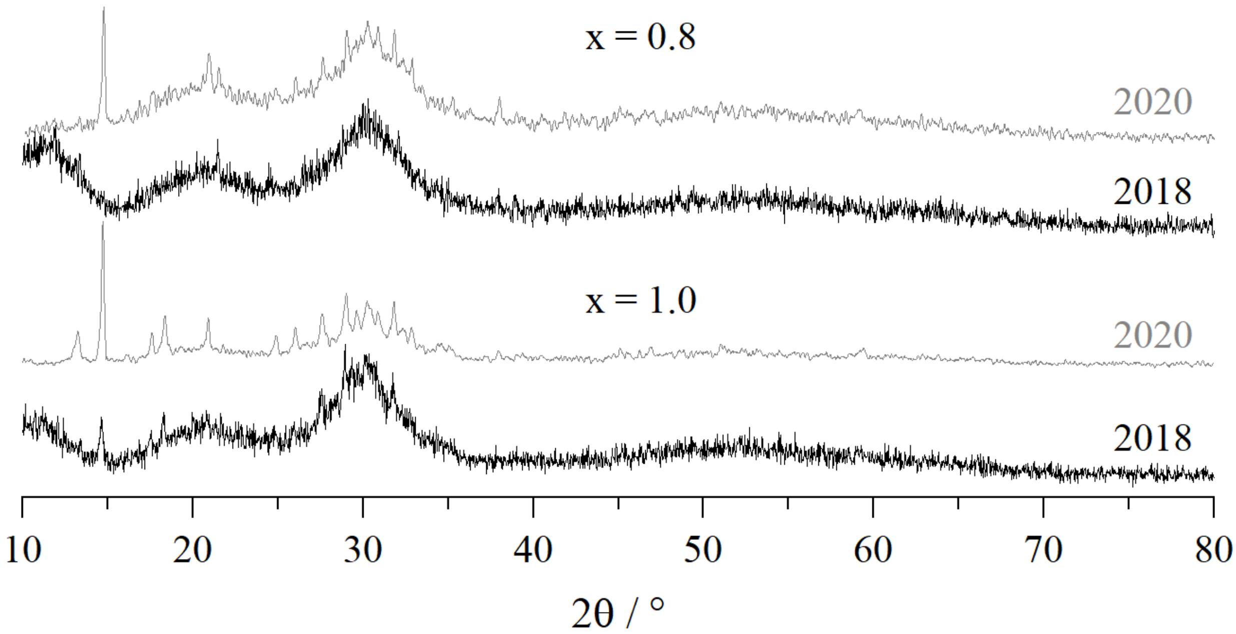


Figure S3: Comparison of powder X-ray diffractograms of $(Na_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ glasses with x = {0.8;1.0}, recorded shoftly after preparation (2018) and two years later (2020). Visible diffration bands are attributable to $Na_2Te_2O_5(H_2O)_2$ (see also Figure S2).

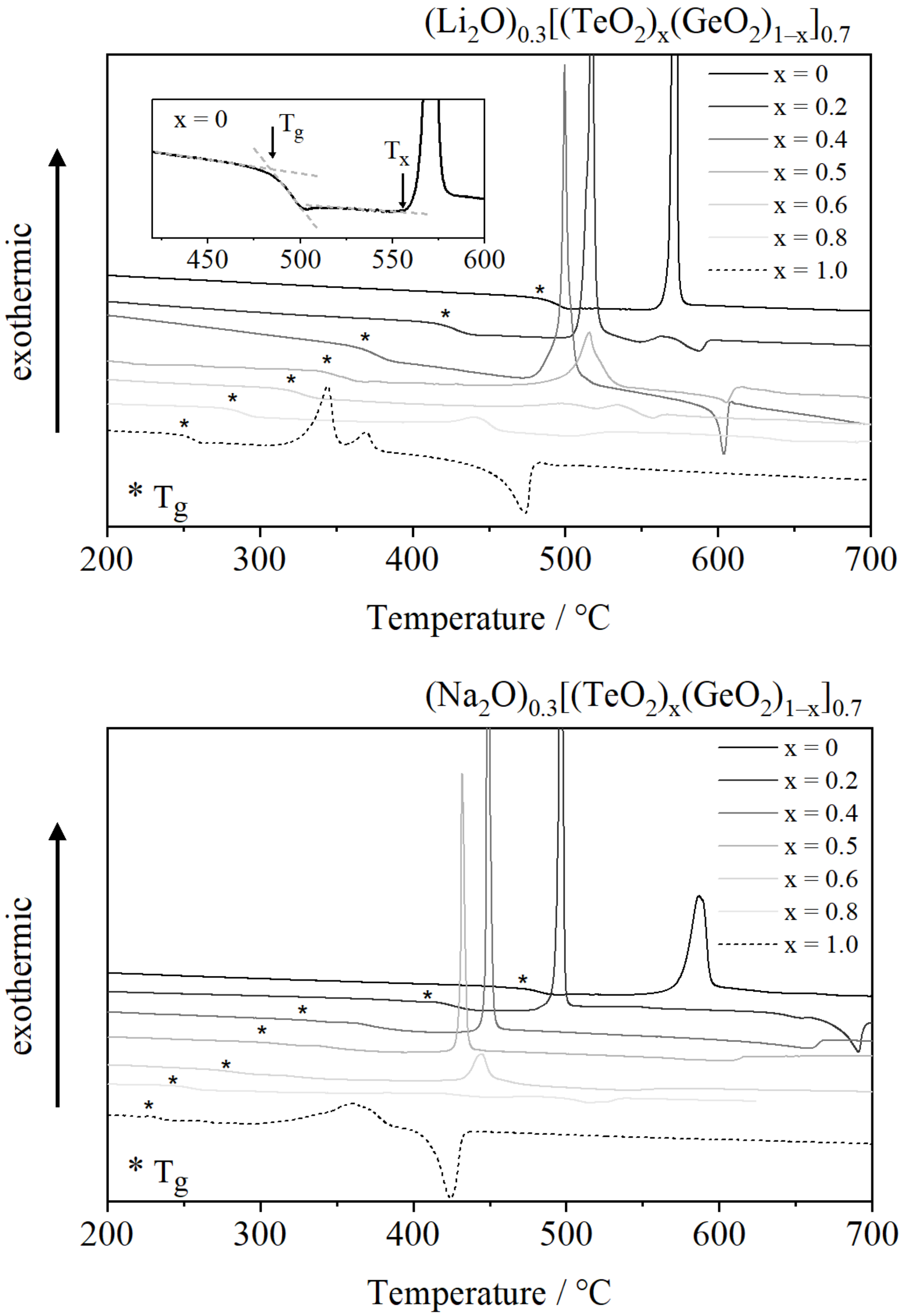


Figure S4: DSC curves of $(A_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ (A = Li, Na) glasses. The inset (top) shows exemplarily the extraction of characteristic temperatures T_x and T_g (indicated by asterisks).

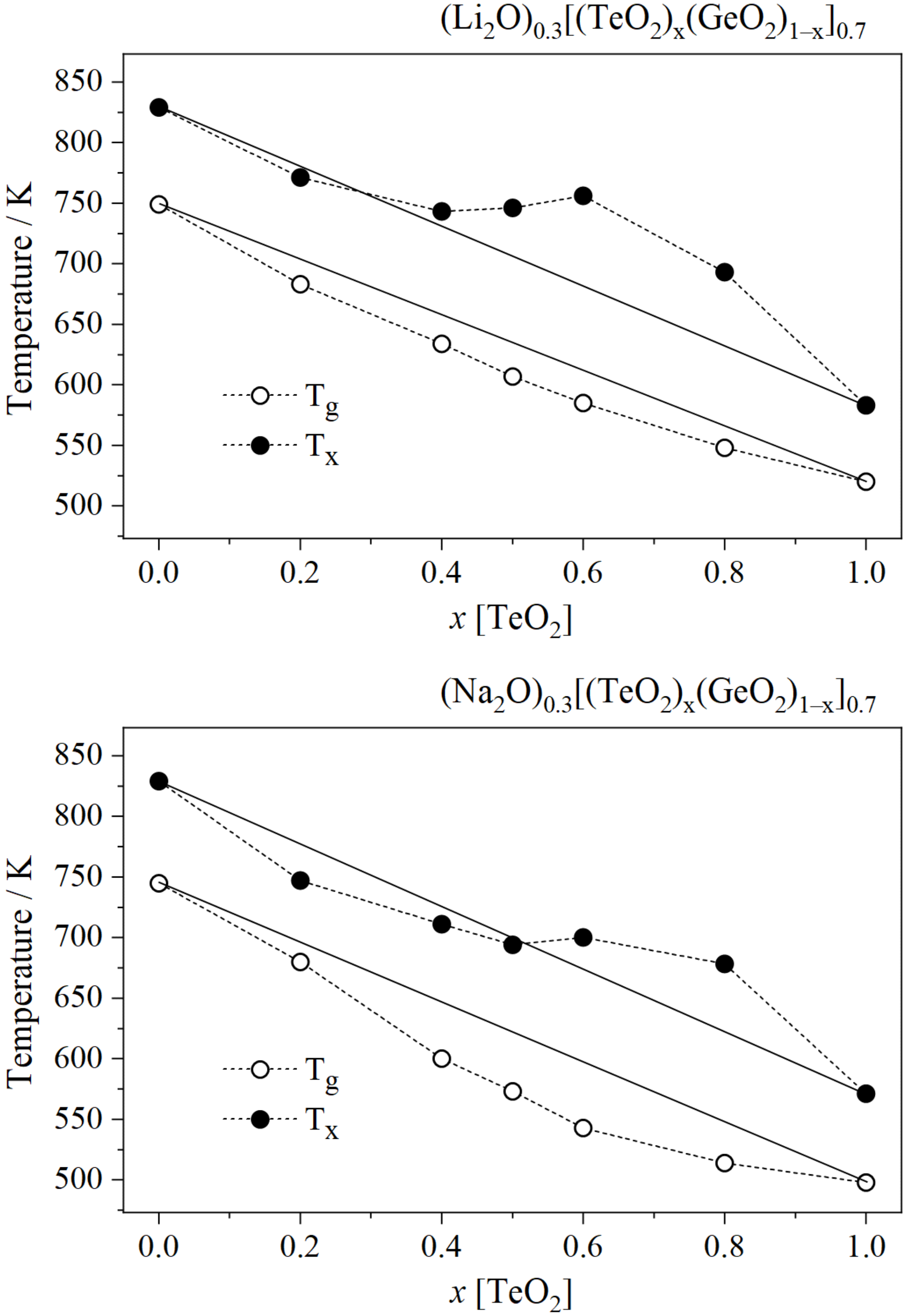
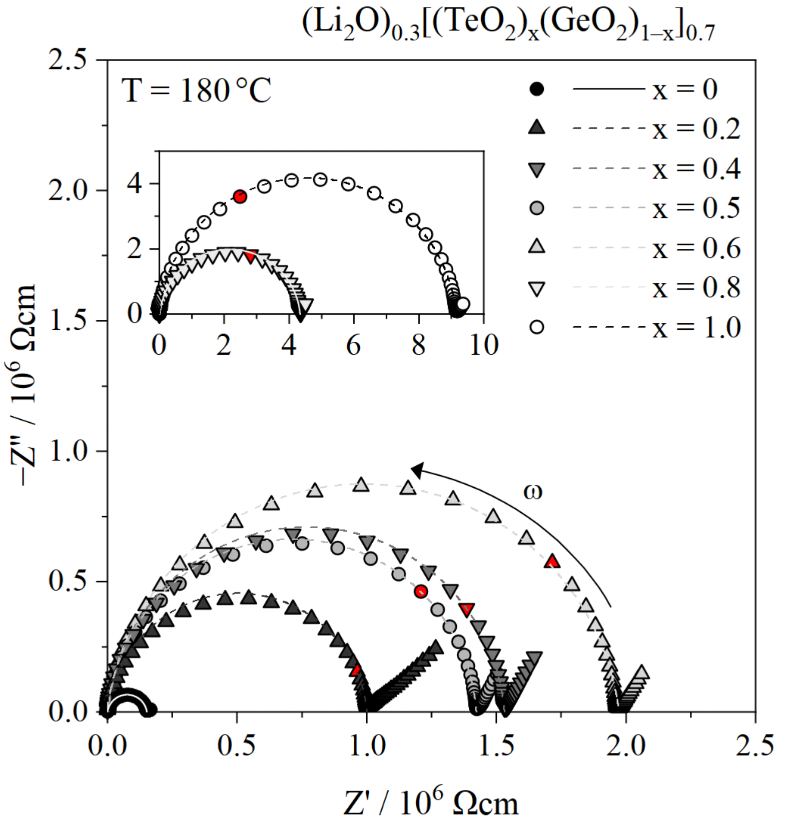


Figure S5: Characteristic temperatures T_x and T_g of $(A_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ (A = Li, Na) glasses against glass composition *x*. Solid lines serve as guide to the eye and connect the values of endmember compositions $x = 0$ ($(A_2O)_{0.3}(GeO_2)_{0.7}$) and $x = 1$ ($(A_2O)_{0.3}(TeO_2)_{0.7}$).



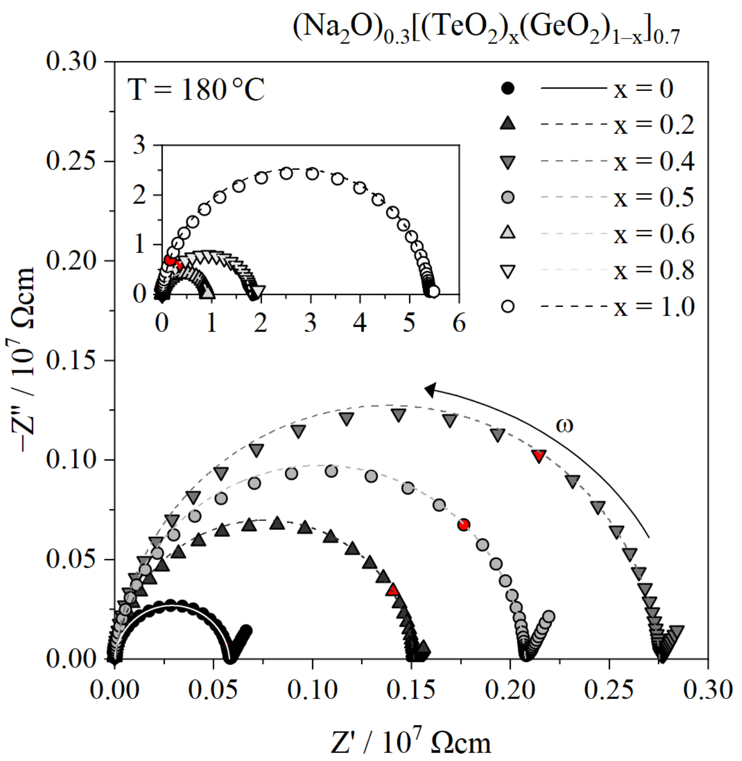


Figure S6: Complex plane plot of impedance data of $(A_2O)_{0.3}[(TeO_2)_x(GeO_2)_{1-x}]_{0.7}$ (A = Li,Na) glasses recorded at 180 °C. Red data points indicate a frequency of 10 kHz. The solid and dashed lines indicate least-squares fits to the data according to the semi-circle function $y = -(y_0 + (r^2 - (x\text{-}x_0)^2)^{1/2})$, where x_0 and y_0 represent offsets on the Z' and Z'' axes respectively, and r represents the radius of the semi-circle. Data are divided by the geometrical factor l/S (l = sample thickness, S = area of the electrode), so the non-trivial zero of the fit function then corresponds to the real resistivity value, used to calculate the conductivity shown in the Arrhenius plots in Figure 1.

References

[1] Altomare, A., Corriero, N., Cuocci, C., Falcicchio, A., Moliterni, A., Rizzi, R., QUALX2.0: a qualitative phase analysis software using the freely available database POW_COD, *J. Appl. Cryst.* 48 (2015). 598-603.

[2] Grazulis, S., Chateigner, D., Downs, R. T., Yokochi, A. T., Quiros, M., Lutterotti, L., Manakova, E., Butkus, J., Moeck, P. & Le Bail, A., Crystallography Open Database – an open-access collection of crystal structures, *J. Appl. Cryst.* 42 (2009), 726-729.