Electrical Supplementary Information for

Insights into the flexibility of ZrM_xO_y (M= Na, Mg, Al) nanofibrous membranes as promising infrared stealth materials

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Table S1 Summary of lattice parameters, tetragonal ratio, and grain size of the Na, Mg, and Al doped ZNF membranes with the uniform dopant content of 5 mol%. Theoretical lattice constants of monoclinic and tetragonal zirconia was also given.

Dopant	Lattice parameters						Tetragonal ratio (%)	Grain size (nm)	
	a (Å)	b (Å)	c (Å)	α (°)	β (°)	γ (°)		m	t
Na	5.320	5.191	5.157	90	99.2	90	5.8	32.7	60.4
Mg	5.318	5.200	5.155	90	99.2	90	8	25.2	31.2
Al	3.607	-	5.169	90	90	90	80.6	25.8	22.8
monoclinic	5.313	5.213	5.147	90	99.2	90	0	-	-
tetragonal	3.595	-	5.193	90	90	90	100	-	-

Table S2 Summary of solid solution compensation mechanism, chemicals, and density of ZrM_xO_y nanofibrous membranes with the uniform dopant content of 5 mol%. Theoretical density of monoclinic and tetragonal zirconia was also given.

Dopant	Solid solution compensation mechanism	Chemical	Density (g cm^{-3})
Na	Vacancy	$Zr_{0.9}Na_{0.1}O_{1.85}$	5.386
	Dopant interstitial	$Zr_{1.8/1.85}Na_{0.2/1.85}O_2$	5.823
Mg	Vacancy	$Zr_{0.95}Mg_{0.05}O_{1.95}$	5.62
	Dopant interstitial	$Zr_{1.9/1.95}Mg_{0.1/1.95}O_2$	5.762
Al	Vacancy	$Zr_{0.9}Al_{0.1}O_{1.95}$	5.728
	Dopant interstitial	$Zr_{1.8/1.95}Al_{0.2/1.95}O_2$	5.875
monoclinic		ZrO_2	5.816
tetragonal		ZrO_2	6.097

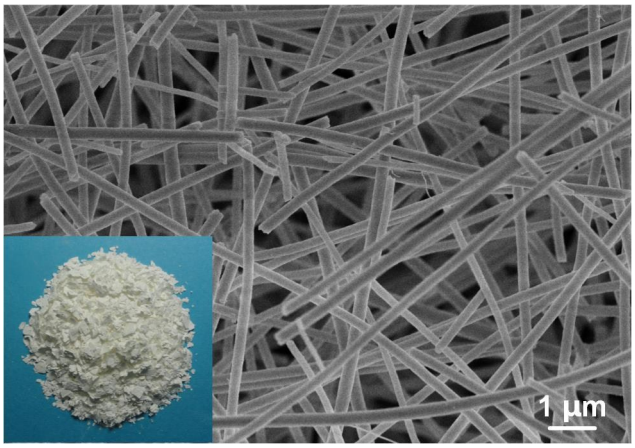

Fig. S1 FE-SEM image of the zirconia nanofibrous membranes without dopant. Inset is the optical image of the relevant membranes.

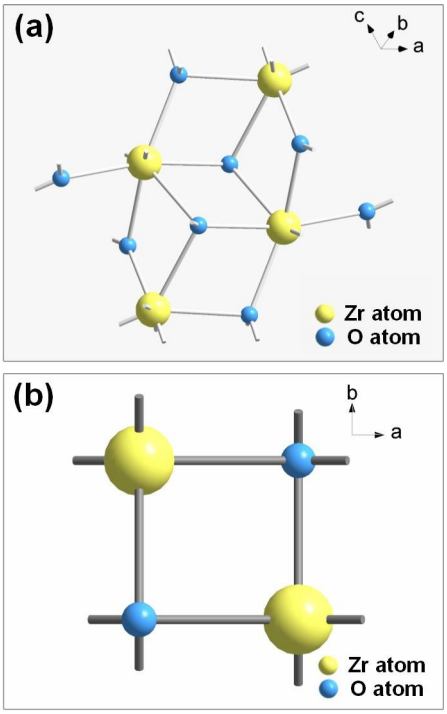

Fig. S2 Schematic representation of theoretical (a) monoclinic and (b) tetragonal cell structures of zirconia power, respectively.

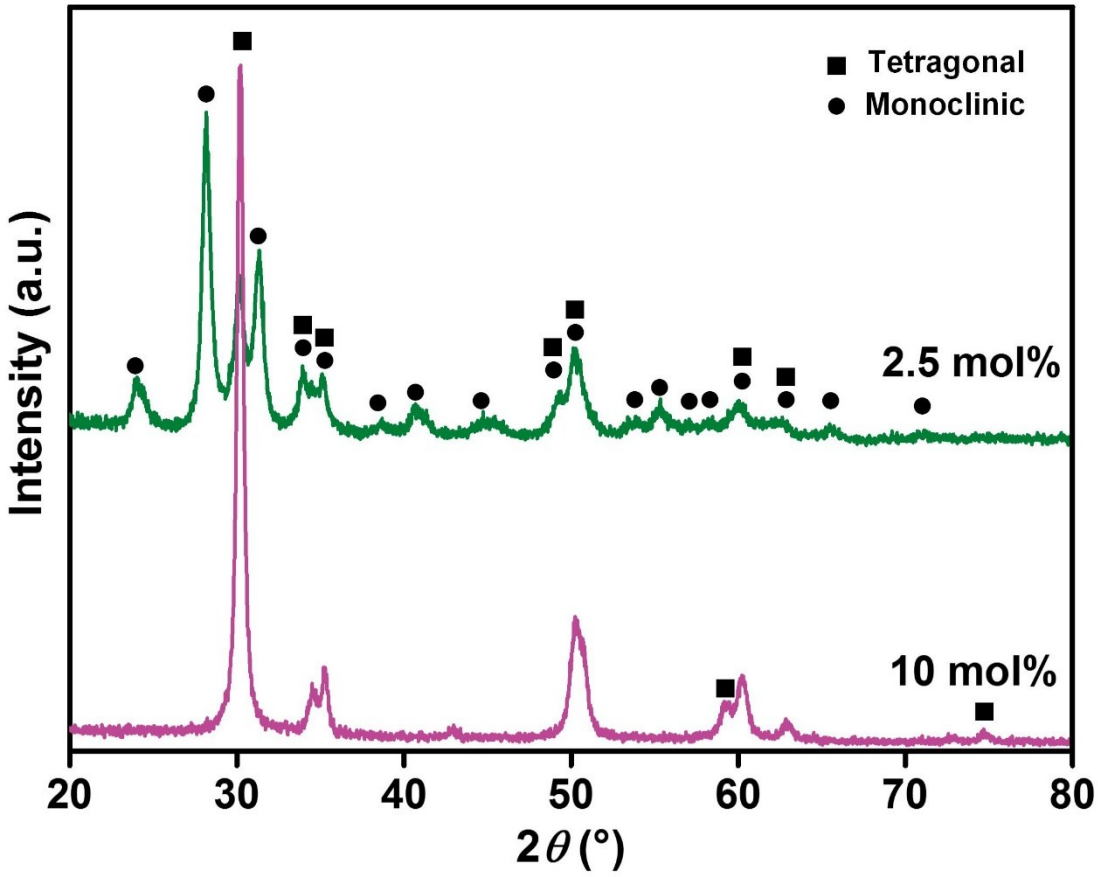

Fig. S3 XRD patterns of Al doped ZNF membranes with the dopant contents of 2.5 and 10 mol%.