Supporting Information

Lithium Vapor Chemistry of Hyper-Stoichiometric Lithium Metatitanate $Li_{2.12(2)}TiO_{3+y}$

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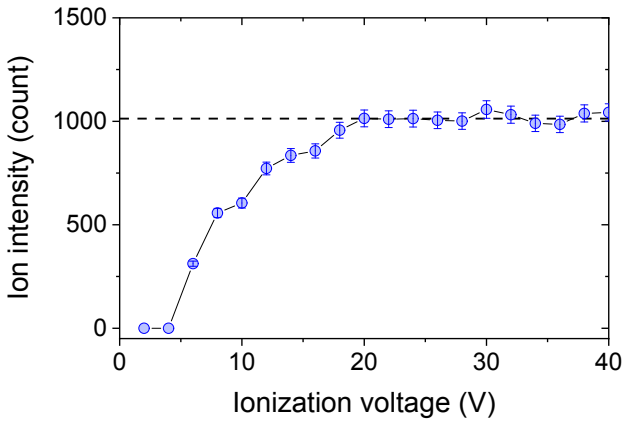

Fig. S1. Ionization voltage curve obtained by counting ^{7}Li for 30 s from the hyper-stoichiometric pebbles where horizontal broken line denote average intensity from 20 to 40 V. Error bar represents standard deviation (4%) deriving from deviations in ion intensity. The measurements were carried out by decreasing ionization voltages. The results showed that an ionization voltage of 20 V was enough for ionization, in which no fragmentation was observed in the ionization voltage range of 20–40 V.

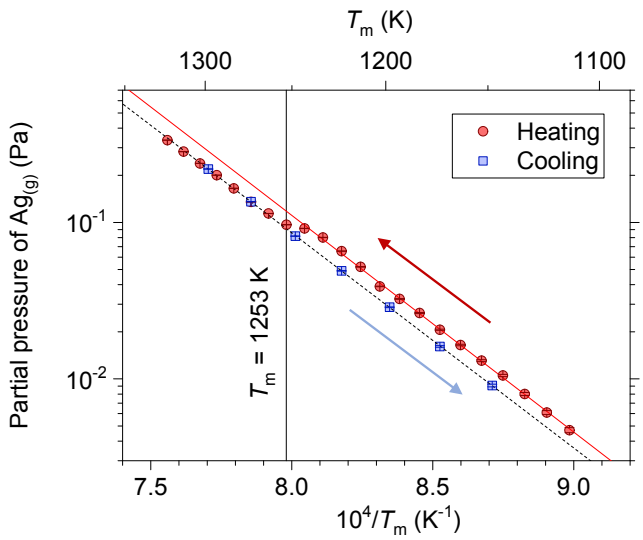

Figure S2. Vapor pressures of Ag(g) from the standard Ag sample during heating and cooling, in which T_m is temperature measured by the thermocouple with no calibration. The vertical black solid line represents T_m = 1253 K.

Table S1 Vapor pressures p_i (Pa) over the Li_2TiO_3 and $Li_{2.12(2)}TiO_{3+y}$ pebbles in vacuum condition.

$\log p_i$	Li_2TiO_3	$Li_{2.12(2)}TiO_{3+y}$
$\log p_{Li(g)}$	$(6.96 \pm 0.28) - (13.8 \pm 0.55) \times 10^3/T$	$(9.22 \pm 0.37) - (16.1 \pm 0.64) \times 10^3/T$
$\log p_{Li_2O(g)}$	$(10.0 \pm 0.40) - (20.1 \pm 0.80) \times 10^3/T$	$(8.32 \pm 0.33) - (15.7 \pm 0.63) \times 10^3/T$
$\log p_{O_2(g)}$	$(4.96 \pm 0.20) - (10.3 \pm 0.41) \times 10^3/T$	$(9.57 \pm 0.38) - (17.3 \pm 0.69) \times 10^3/T$

Table S2 Vapor pressures p_i (Pa) over the Li_2TiO_3 and $Li_{2.12(2)}TiO_{3+y}$ pebbles in D_2 condition, in which pressures are separately described for the β phase (T < 1428 K) and the γ phase (T > 1428 K).

$\log p_i$	Temperature (K)	Li_2TiO_3 pebbles	$Li_{2.12}TiO_{3+y}$ pebbles
$\log p_{Li(g)}$	$1154 < T < 1428$	$(11.0 \pm 0.44) - (17.2 \pm 0.69) \times 10^3/T$	$(7.17 \pm 0.29) - (11.4 \pm 0.46) \times 10^3/T$
	$1428 < T < 1546$	$(8.08 \pm 0.32) - (13.3 \pm 0.53) \times 10^3/T$	$(5.32 \pm 0.21) - (8.72 \pm 0.35) \times 10^3/T$
$\log p_{LiOD(g)}$	$1203 < T < 1428$	$(10.6 \pm 0.42) - (17.7 \pm 0.71) \times 10^3/T$	$(8.73 \pm 0.35) - (13.4 \pm 0.54) \times 10^3/T$
	$1428 < T < 1546$	$(8.11 \pm 0.32) - (13.7 \pm 0.55) \times 10^3/T$	$(1.73 \pm 0.07) - (3.58 \pm 0.14) \times 10^3/T$
$\log p_{D_2O(g)}$	$1154 < T < 1428$	$(2.45 \pm 0.98) - (6.82 \pm 0.27) \times 10^3/T$	$(3.99 \pm 0.16) - (7.21 \pm 0.29) \times 10^3/T$
	$1428 < T < 1546$	$-(1.01 \pm 0.04) - (1.66 \pm 0.07) \times 10^3/T$	$(0.14 \pm 0.006) - (1.69 \pm 0.07) \times 10^3/T$
$\log p_{D_2(g)}$	$1154 < T < 1428$	$-(2.40 \pm 0.10) + (1.15 \pm 0.05) \times 10^3/T$	$-(0.15 \pm 0.006) - (2.22 \pm 0.09) \times 10^3/T$
	$1428 < T < 1546$	$-(5.70 \pm 0.23) + (5.83 \pm 0.23) \times 10^3/T$	$-(2.03 \pm 0.08) + (0.10 \pm 0.004) \times 10^3/T$