## **Electronic supplementary information (ESI):**

## Formation and evolution of nanoporous dendrites during dealloying

## of ternary Al-Ag-Au precursor

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	Point	Al, at%	Ag, at.%	Au, at.%
	1	60.6	7.4	32.0
Dendrite	2	59.9	8.9	31.2
	3	61.0	8.7	30.3
	4	61.3	8.4	30.3
	5	59.4	9.9	30.7
	6	60.4	10.2	29.4
	Average value/standard error	60.4/0.7	8.9/1.0	30.7/0.9
	1	47.1	46.8	6.1
	2	46.7	48.6	4.7
Eutectic	3	43.8	49.5	6.7
matrix	4	44.7	50.9	4.4
	5	45.1	51.2	3.7
	Average value/standard error	45.5/1.4	49.4/1.8	5.1/1.2

Table S1 Chemical compositions of the dendrites and lamellar eutectic matrix of the rapidly

solidified Al<sub>65</sub>Ag<sub>22.75</sub>Au<sub>12.25</sub> precursor.

Table S2 Chemical compositions of the np-AgAu alloy obtained after the 2<sup>nd</sup> dealloying in the 20

Area	Al, at%	Ag, at.%	Au, at.%
1	8.4	63.7	27.9
2	13.2	57.1	29.7
3	8.1	58.5	33.4
4	7.2	62.1	30.7
5	11.4	61.5	27.1
Average value/standard error	9.6/2.5	60.6/2.7	29.8/2.5

wt.% NaOH solution.



Fig. S1. EDX spectra of the dendrites in the rapidly solidified  $Al_{65}Ag_{22.75}Au_{12.25}$  precursor.



Fig. S2. EDX spectra of the lamellar eutectic matrix in the rapidly solidified  $Al_{65}Ag_{22.75}Au_{12.25}$ 

precursor.



Fig. S3. Back-scattered section-view SEM image of the rapidly solidified Al<sub>60</sub>Ag<sub>40</sub> alloy.



Fig. S4. SEM images showing the section-view microstructure of the as-dealloyed  $Al_{65}Ag_{22.75}Au_{12.25}$  sample obtained after the 1<sup>st</sup> dealloying in the 5 wt.% HCl solution.



Fig. S5. SEM images showing the section-view microstructure of the np-AgAu alloy obtained after the  $2^{nd}$  dealloying of Al<sub>65</sub>Ag<sub>22.75</sub>Au<sub>12.25</sub> in the 20 wt.% NaOH solution.



Fig. S6. EDX spectra of the np-AgAu alloy obtained after the 2<sup>nd</sup> dealloying in the 20 wt.% NaOH

solution.



Fig. S7. SEM images showing the section-view microstructure of the np-Au dendrites obtained after the  $3^{rd}$  dealloying of Al<sub>65</sub>Ag<sub>22.75</sub>Au<sub>12.25</sub> in the 65 wt.% HNO<sub>3</sub> solution.



Fig. S8. SEM image showing the microstructure of the np-Ag sample obtained by dealloying the

rapidly solidified  $Al_{65}Ag_{35}$  alloy in the 5 wt.% HCl solution.



Fig. S9. SEM images showing the section-view microstructure of the np-AgAu alloy obtained through the two-step dealloying of the rapidly solidified  $Al_{65}Ag_{25}Au_{10}$  precursor firstly in the 5wt.% HCl solution and then in the 20 wt.% NaOH solution.