

1 **Supplementary Information**

2 **Three-dimensional Hydrogen Distribution and Quantitative**
3 **Determination of Titanium Alloys via Neutron Tomography**

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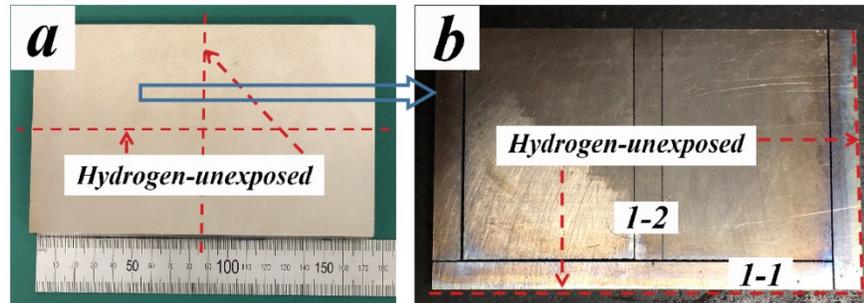
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15 ***Sampling method for neutron tomography experiments:***

16 There were two large plate Ti-6Al-4V samples used for neutron tomography
17 experiments. Both samples were 172 mm (length)×106 mm (width)×15 mm (thick) in
18 size. One was hydrogenated by THP, the other was unhydrogenated and used as the blank
19 sample. During THP, all six sides of the large plate sample were exposed to hydrogen. In
20 the following the hydrogenated plate sample was cut into four equal sections by wire-
21 electrode cutting. Small specimens (1-1 and 1-2) were cut further from the quarter of the
22 plate sample and the hydrogen-unexposed surfaces (sample interior during THP) were

23 showed in red dashed line (**Fig. S1**). The blank plate sample was cut in the same way, the
24 corresponding specimen numbers were 0-1 and 0-2.



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26 **Fig. S1** Sampling method for neutron tomography experiments. (a) The hydrogenated Ti-
27 6Al-4V sample was cut into four equal sections, (b) Specimen 1-1 and 1-2 was sampled
28 from the quarter of the plate sample, the hydrogen-unexposed surfaces (sample interior)
29 during THP were showed in red dash lines.

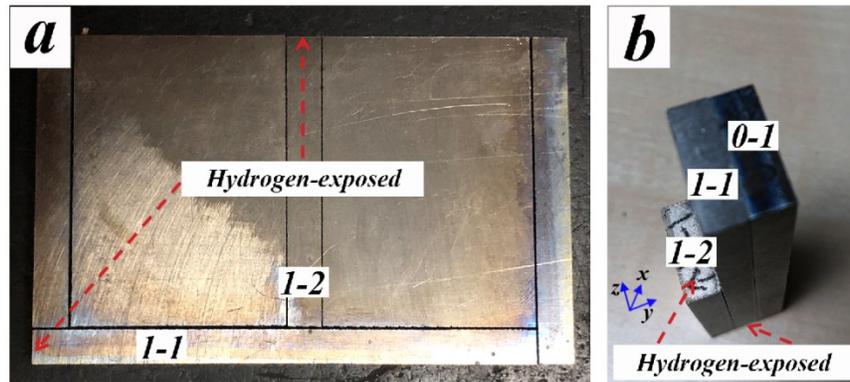
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32 **Fig. S2** The tubular hydrogen treatment furnace and control system made by AVIC
33 Manufacturing Technology Institute.

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36 **Fig. S3** The specimens for the neutron tomography experiment. (a) Sampling positions
 37 from the quarter of the plate sample, (b) the arrangement of specimens for neutron
 38 tomography experiment. The red arrows show the hydrogen-exposed surfaces along z-
 39 direction of the coordinate during neutron tomography experiment.

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41 **Table S1** The attenuation coefficients with neutrons for different elements¹

Elements	Attenuation coefficients with neutrons (cm ⁻¹)
Hydrogen	3.44
Titanium	0.60
Aluminum	0.10
Vanadium	0.72

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References:

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