

1 **Evolution of recrystallized grain and texture of cold-**
2 **drawn pure Mg wire and their effect on mechanical**
3 **properties**

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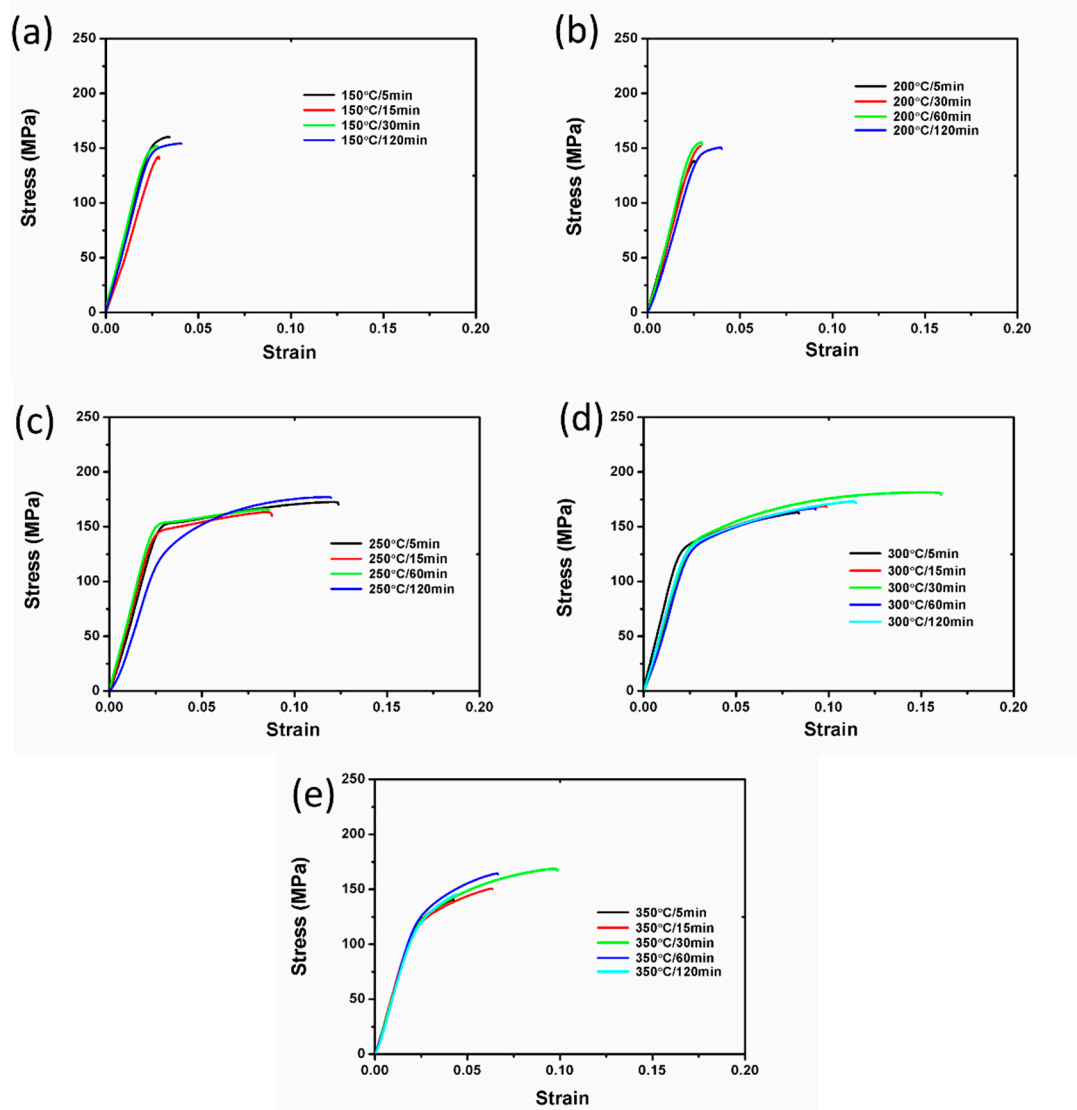
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12 Received: 16 December 2019; Accepted: 14 January 2020; **Published: date**

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15 Supplementary Figures

16 The tensile test was carried out on the Mg wires with the diameter of 1.5 mm. Figure S1 shows
17 the strain-stress curves of Mg wires with different annealing treatments. The wires annealed at 150
18 °C and 200 °C showed poor plasticity, although the yield strength were relatively high. The plasticity
19 was obviously improved after annealed at 250 °C. However, with the holding time prolonged to 120
20 min, there was an evident decline of yield strength. After annealed at 300 °C for 30 min, the wires
21 obtained best plasticity, with no significant decrease of yield strength. With the further increase of
22 temperature, both the plasticity and yield strength of Mg wires decreased.



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24 **Figure S1.** Strain-stress curves of Mg wires annealed at different temperature: (a) 150 °C; (b) 200 °C;

25 (c) 250 °C; (d) 300 °C; (e) 350 °C.

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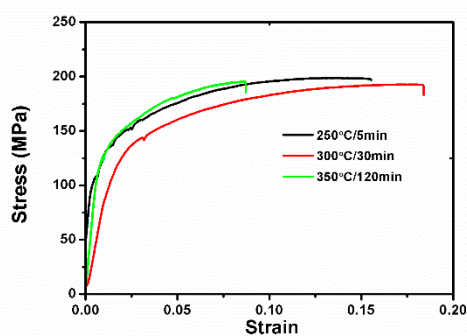
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33 The mechanical properties of thinner annealed Mg wires were also tested. The results are listed
 34 in Figure S2 and Table S1. The tested wires were firstly cold drawn with accumulated true strain of
 35 138 %, and then annealed at 250 °C/5 min, 300 °C/30 min and 350 °C/120 min. Due to the different
 36 diameters, the stress and strain values of the thinner (0.2 mm in diameter) Mg wires were different
 37 from that of the thick wires to some extent. The thin wires annealed at 300 °C for 30 min exhibited
 38 preferable integrated mechanical properties, especially the excellent plasticity. The results further
 39 confirm that annealing treatment at 300 °C/30 min is appropriate for the improvement of mechanical
 40 properties of cold drawn Mg wires.



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42 **Figure S2.** Strain-stress curves of thin Mg wires (0.2 mm in diameter) with true strain of 138% after
 43 different annealing treatments.

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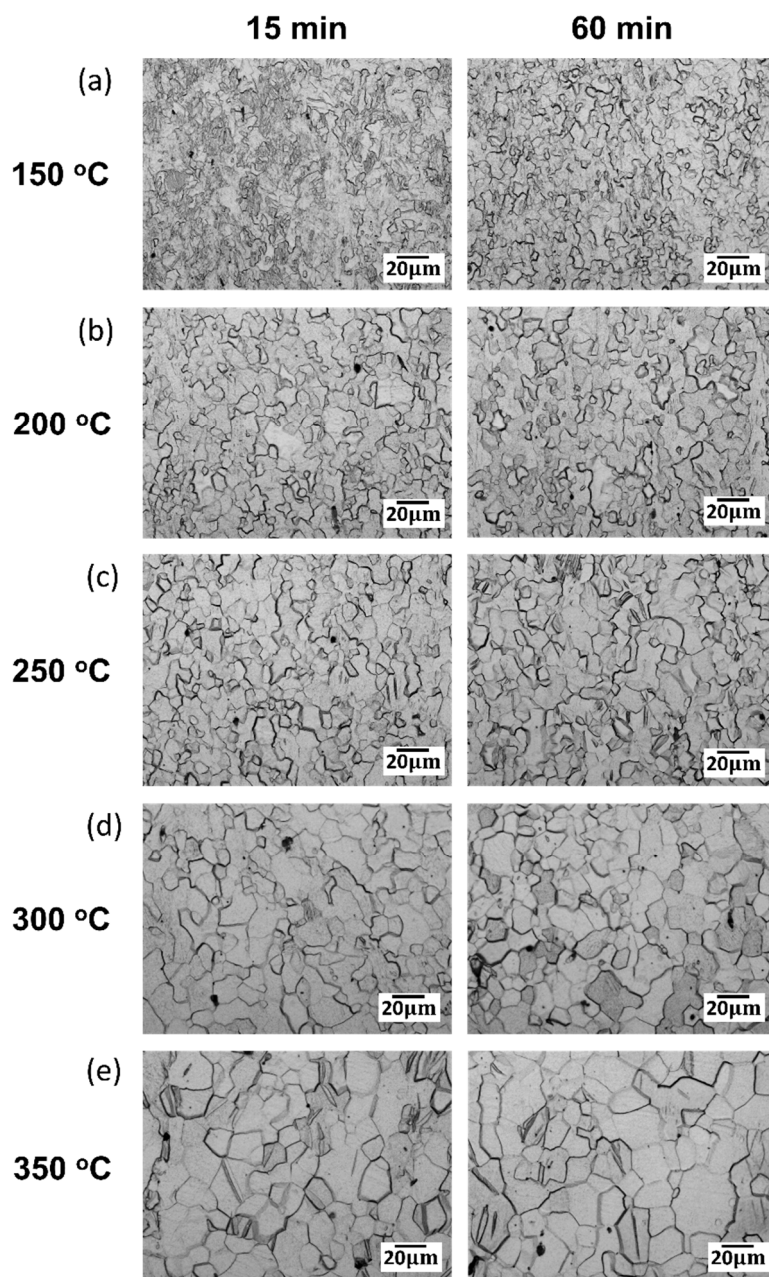
Table S1. The statistic results of tensile test for thin Mg wires with diameter of 0.2 mm after different
 annealing treatments.

Annealing process	Ultimate strength(MPa)	Yield strength (MPa)	Elongation(%)
250 °C /5 min	199	100	13.3
300 °C/30 min	196	96	16.1
350 °C/120 min	195	92	9.1

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48 The metallographic microstructures of Mg wires with the diameter of 1.5 mm annealed at 150
49 °C, 200 °C, 250 °C, 300 °C and 350 °C for 15 min and 60 min are shown in Figure S3.



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51 **Figure S3.** Annealed microstructures of pure Mg with different annealing process. (a) 150 °C; (b) 200
52 °C; (c) 250 °C; (d) 300 °C; (e) 350 °C.

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