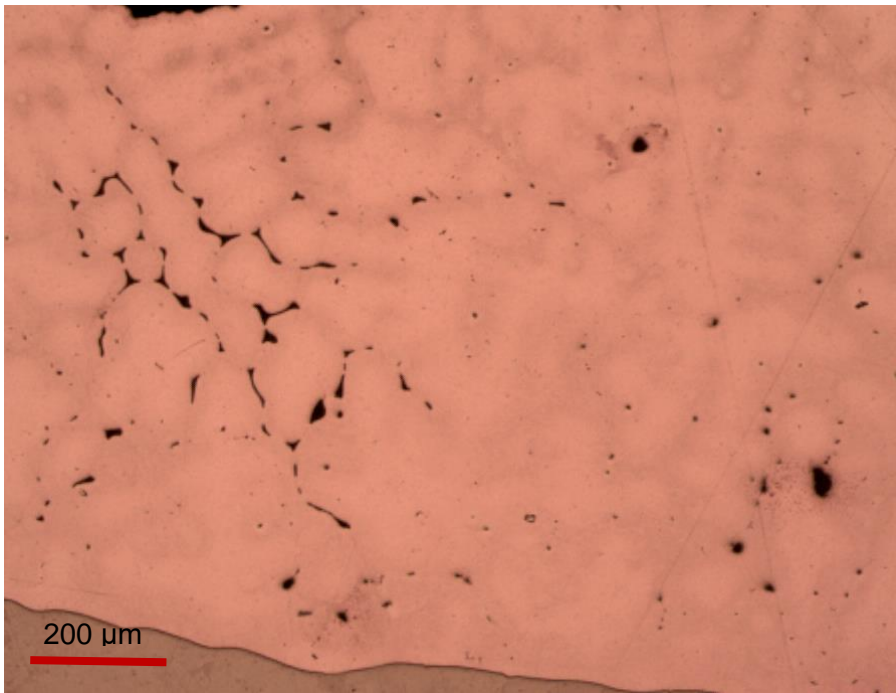


**Figure S1.** Sections of the sword-hilt.



**Figure S2.** Dendritic structure of copper welding the two hemispheres of the pommel P1.

**Table S1.** Grain size of the blade G6 estimated on 200x LOM micrographs according to the different microstructure observed

Sample	Microstructure	Grain size ( $\mu\text{m}$ )
<b>G6</b>		
<b>P1</b>	Pearlite and Ferrite	$8.97 \pm 2.2$
	Pearlite and Ferrite Widmanstätten	$1.99 \pm 0.3$
<b>E1</b>	Ferrite and Pearlite	$15.9 \pm .45$
	Ferrite and Pearlite (on one side)	$50.1 \pm 10.2$
<b>I1</b>	Ferrite	$6.3 \pm 0.9$
	Ferrite and Pearlite (on an external side of sample)	$30.9 \pm 2.9$
	Ferrite and Pearlite	$19.6 \pm 2.1$
	Ferrite and Pearlite	$48.5 \pm 12.0$
	Pearlite and Cementite	$32.3 \pm 8.8$
<b>L1</b>	Pearlite and Ferrite	$16.8 \pm 3.9$
	Ferrite	$31.3 \pm 9.3$
	Pearlite and Cementite	$15.8 \pm 1.2$
	Martensite and Cementite	$27.8 \pm 2.3$
	Martensite	$22.9 \pm 2.1$

**Table S2.** Grain size of the blade G8 estimated on 200x LOM micrographs according to the different microstructure observed

Sample	Microstructure	Grain size ( $\mu\text{m}$ )
<b>G8</b>		
<b>P2</b>	Widmanstätten like ferrite	19.1 $\pm$ 2.9
	Pearlite	7.6 $\pm$ 3.4
	Ferrite	10.8 $\pm$ 2.1
<b>E2</b>	Ferrite	10.2 $\pm$ 1.9
	Ferrite and Pearlite	15.5 $\pm$ 3.2
<b>I2</b>	Ferrite	9.9 $\pm$ 1.7
	Ferrite and Pearlite	16.1 $\pm$ 1.2
	Pearlite and Widmanstätten like ferrite	31.3 $\pm$ 10.1
	Pearlite and cementite	12.7 $\pm$ 0.9
<b>L2I</b>	Ferrite	8.1 $\pm$ 2.3
	Ferrite and Pearlite	21.5 $\pm$ 6.5
	Pearlite and Widmanstätten like ferrite.	12.2 $\pm$ 7.8
	Pearlite and Cementite	14.1 $\pm$ 2.3
	Martensite	13.6 $\pm$ 1.6
<b>L2P</b>	Ferrite	19.5 $\pm$ 3.1
	Ferrite and Pearlite	35.5 $\pm$ 8.1
	Martensite	8.8 $\pm$ 1.5

**Table S3.** Microhardness profile of samples L1 and L2I.

Site of measurement	Description	Microhardness (HV 0.5)
<i>L1</i>		
1	Martensitic edge	583±52
2	center	420±32
3	Hypereutectoid steel	620±25
<i>L2</i>		
1	Martensite and lower bainite	532±34
2	pearlite	323±23
3	pearlite and ferrite	144±10
4	pearlite and Widmanstätten like ferrite	250±19
5	pearlite and ferrite	153±12
6	pearlite and Widmanstätten like ferrite	259±20