

CARBOTHERMAL REDUCTION OF MILL SCALES FORMED ON STEEL BILLETS DURING CONTINUOUS CASTING

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Supplement

Calculus of the mean crystallite sizes:

The crystallite size was calculated following the Scherrer formula:

$$D = \frac{K\lambda}{\beta \cos \theta} \quad (1)$$

Where:

D: mean crystallite size (nm)

K: 0.94 Scherrer Constant

λ : 0.154056 nm (Cu target radiation)

β : FWHM (Full Width at Hat Maximum in radians)

θ : Peak positions (radians)

The FWHM was obtained from the Rietveld refinement of the XRD obtained by Cu-radiation, as shown in Fig. S1

The obtained FWHM are 0.00183 and 0.00186 radians for (110) and (200) Bragg positions respectively.

F (110) reflection has the peak position of $\theta = 0.38992$ so the average particle size is:

$$D(110) = \frac{0.94 * 0.154056}{0.00183 * \cos(0.38992)}$$

$$D(110) = 85.6 \text{ nm}$$

and (200) reflection in position of $\theta = 0.56755$ gives the average particle size of:

$$D(200) = \frac{0.94 * 0.154056}{0.00186 \cos(0.56755)}$$

$$D(200) = 92.4 \text{ nm}$$

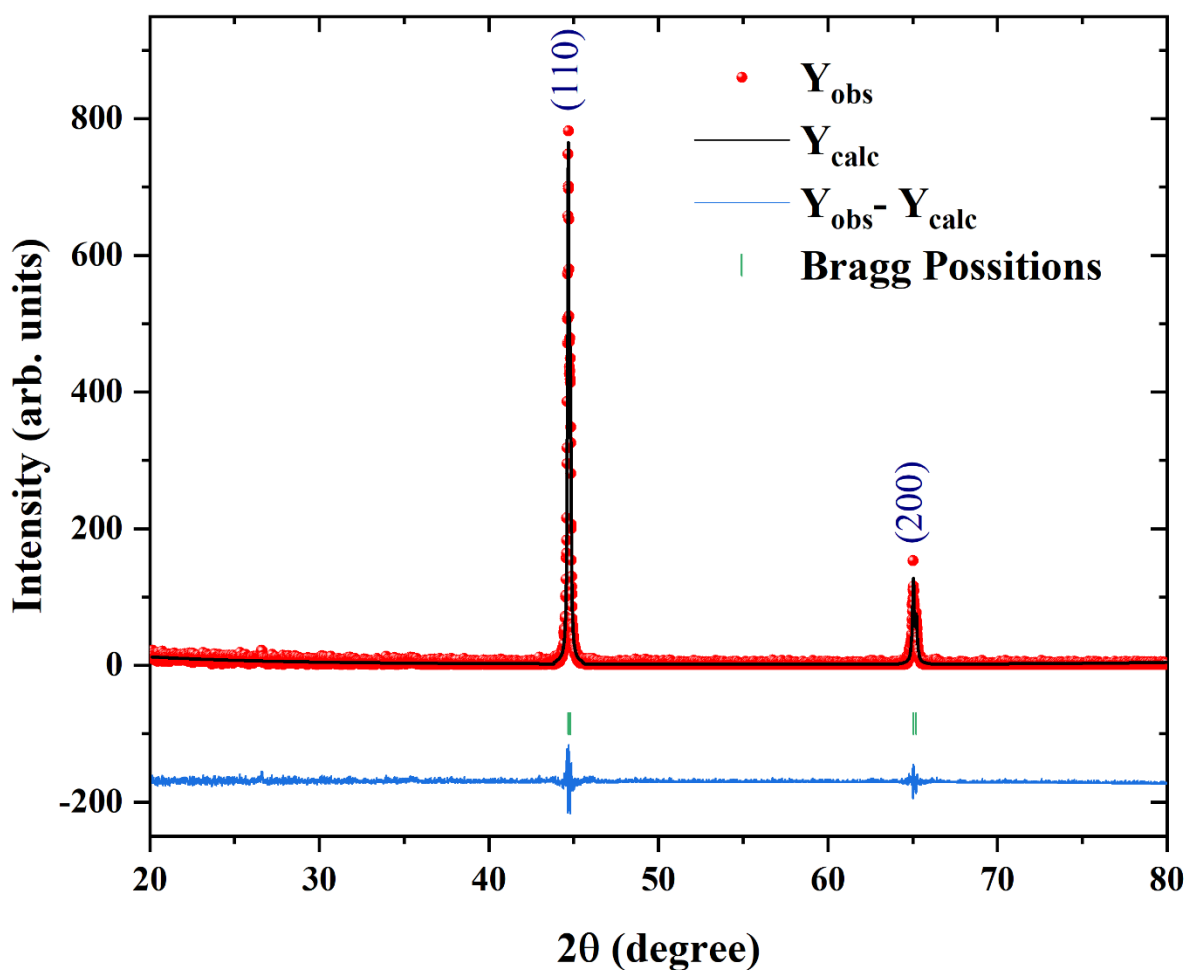


Fig. S1. Rietveld refinement of the XRD obtained by Cu-radiation