Rietveld quantification of γ-C_2S conversion rate supported by synchrotron X-ray diffraction images

基于同步回旋加速器X射线衍射图像的 γ–C_2S转化率的Rietveld量化法

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Main goal

The Rietveld method and synchrotron X-ray diffraction images were used to accurately quantify γ -C_2S conversion rate.

Results and discussion

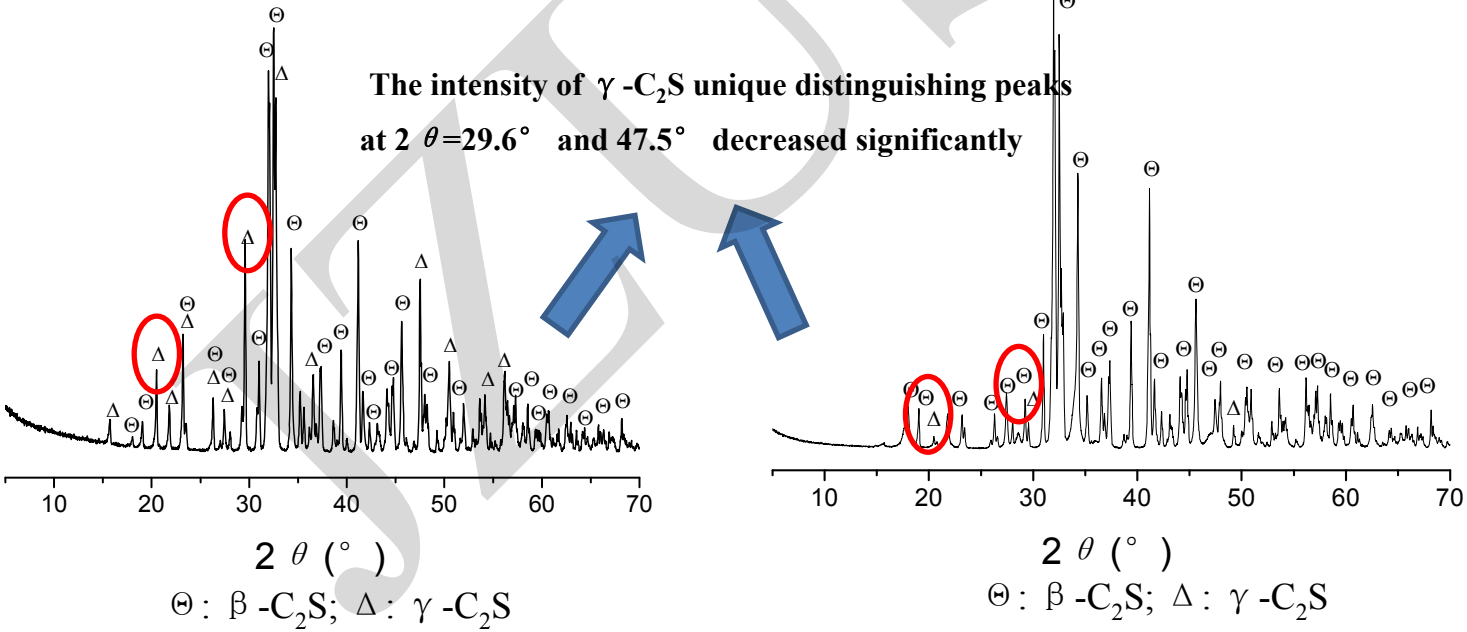


Fig. 2 LXRD pattern of β -C_2S air-cooled at the first time

Fig. 3 LXRD pattern of β -C_2S water-cooled at the second time

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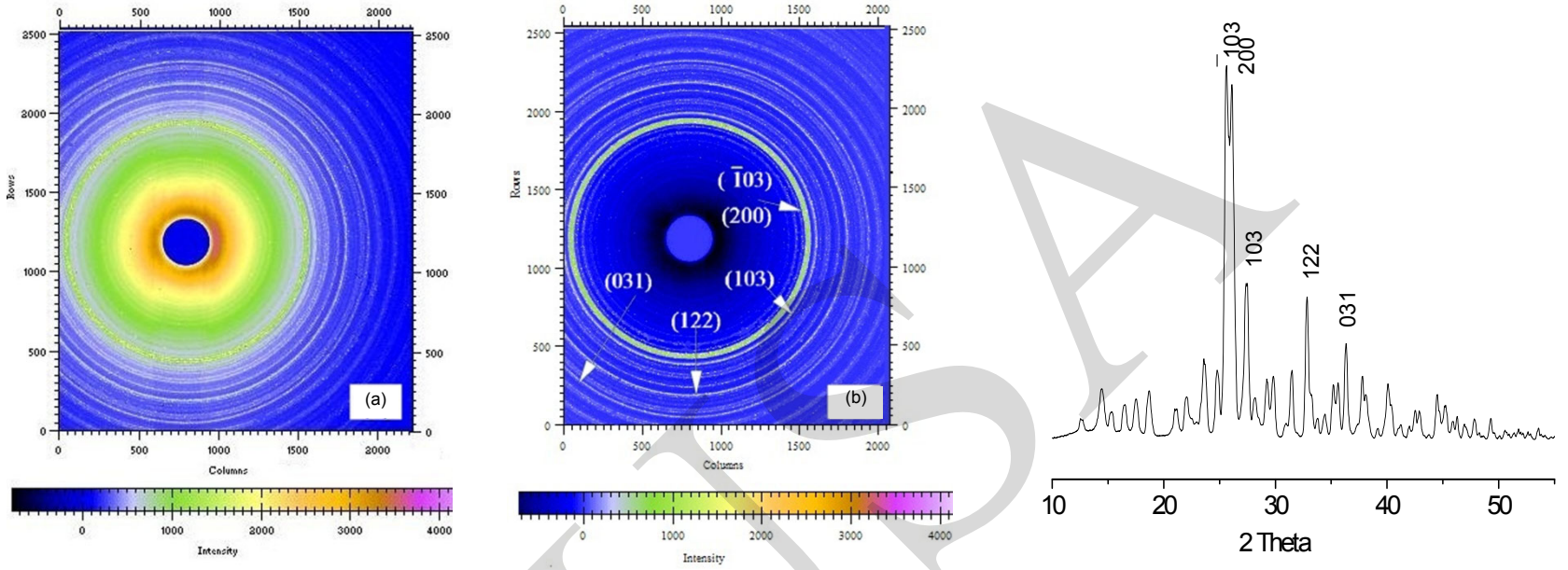


Fig. 5 Synchrotron X-ray diffraction images of C_2S sample with (a) and without (b) polyimide tape (Fig. 5b is obtained through subtracting the transmission X-ray diffraction images of polyimide tape from Fig. 5a)

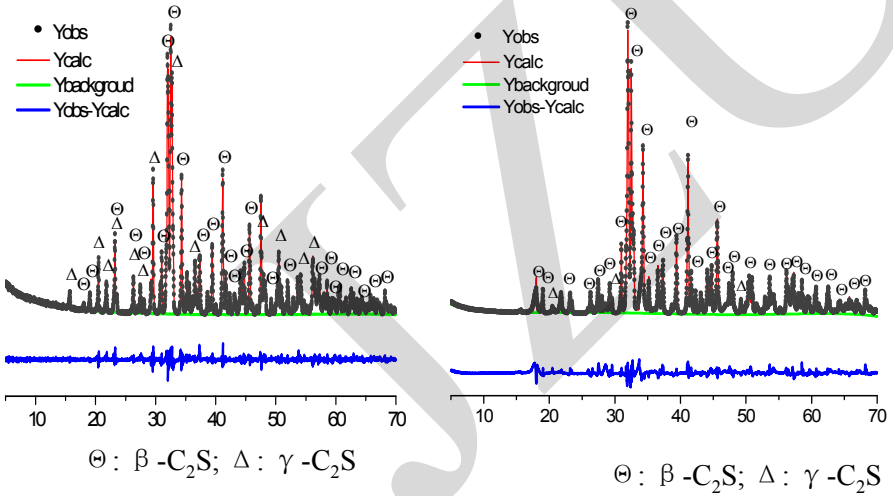
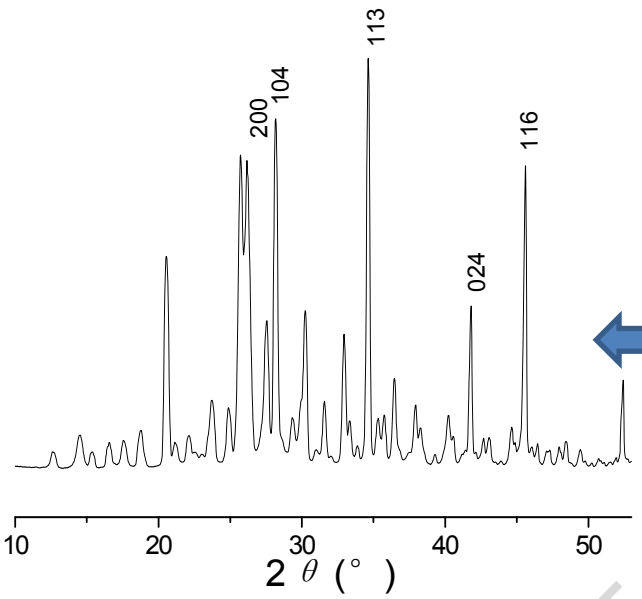


Fig. 7 Rietveld QXRD pattern of β -C_2S air-cooled at the first time

Fig. 8 Rietveld QXRD pattern of β -C_2S water-cooled at the second time



Perfect Consistency

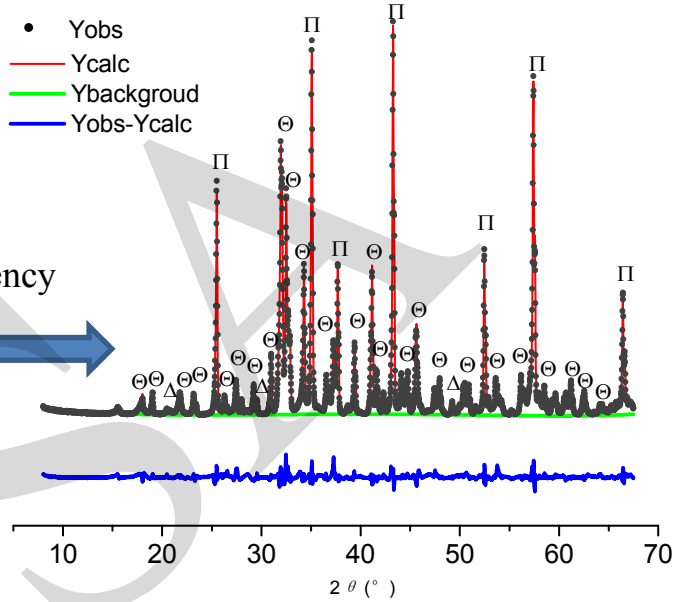


Fig. 10 Integrated diffraction pattern of C_2S and α-Al_2O_3 mixture converted from synchrotron X-ray diffraction images

Θ: β-C_2S; Δ: γ-C_2S; Π: α-Al_2O_3

Fig. 11 Rietveld QXRD pattern for C_2S and α-Al_2O_3 mixture

Conclusions

The relative error between the weighted fraction and the Rietveld weight fraction of the phases (sample of C_2S and α-Al_2O_3) is 2.6%. The absolute error of the γ-C_2S conversion rate between the two LXRD Rietveld refinements is 3.6%. The Rietveld QXDA analysis is an appropriate and accurate method to quantify the γ-C_2S phase conversion.

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