The Mössbauer parameters of anhydrous monoclinic tin/II/ phosphate, Sn$_3$/PO$_4$/2, are reported and briefly discussed. The results agree with the interactions expected from the crystalline structure but differ from previously reported data.

INTRODUCTION

Recently, a number of tin/II/phosphates have been characterized by infrared and Mössbauer spectroscopies. In the case of Sn$_3$/PO$_4$/2 a remarkable difference was found regarding the Mössbauer parameters reported for supposedly the same compound by Friedt and Llabador and Lees and Flinn. Indeed, in both of these cases a single quadrupole doublet was reported of parameters $QS = 1.93$ mm.s$^{-1}$ and $IS = 3.06$ mm.s$^{-1}$ and $QS = 1.90$ mm.s$^{-1}$ and $IS = 3.05$ mm.s$^{-1}$, respectively, with respect to BaSnO$_3$ at room temperature. In order to establish the origin of these discrepancies we performed a series of
Mössbauer measurements at different temperatures on the crystallographically well characterized monoclinic form of Sn$_3$PO$_4$\textsubscript{2}. 

EXPERIMENTAL

Samples preparation and characterization

Samples of Sn$_3$PO$_4$\textsubscript{2} were obtained by solid state reactions of stoichiometric mixtures of SnO and NH$_4$HPO$_4$, working under a dry nitrogen atmosphere at temperatures ranging between 500 and 600 °C\textsuperscript{1}. Some samples were subjected to additional heatings at 200-250 °C, for different periods of time, in order to assure that the recorded spectra were independent from crystal imperfections or disorders. The X-ray powder diagrams of all samples could be indexed with the crystallographic data reported by Mathew et al.\textsuperscript{4}, confirming the structural identity of them.

Other samples obtained by precipitation reactions, starting from different stannous salts and Na$_2$HPO$_4$ solutions, gave entirely different diagrams that were, however, coincident with the respective ASTM file /1-452/. The previous reported Mössbauer data had also been obtained from samples which possessed similar diagrams to that of this file\textsuperscript{3,5}. The structural characteristics of this Sn$_3$PO$_4$\textsubscript{2} modification are yet unknown, as well as those of a trihydrate reported by Klement and Haselbeck\textsuperscript{6}.

Mössbauer data collection

Mössbauer spectra were obtained in a constant acceleration mode with transmission geometry and simultaneous data accumulation in two halves of 256 channels each of