SANDRA: A portable XRF system for non destructive studies of Mexican cultural heritage.

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In the last years, a portable X-ray fluorescence system has been developed specially for non destructive characterization of cultural heritage collections of Mexico. This system, called SANDRA (Sistema de Análisis No Destructivo por RAyos X), is a second prototype designed for in situ analysis in museums and libraries. Oxford Instruments X-ray tubes of Mo, W, or Rh of 75 W, may be employed as excitation source depending on the analytical problem and the studied materials. Two detectors fabricated by AmpTek may be used: A Cadmium Zinc Telluride (CZT) and a Si-Pin as a function of the elemental range to be analyzed. The beam may be collimated from 0.25 up to 3mm, but usual X-ray beam diameter is 1 or 2 mm. Various research topics has been carried out using SANDRA and other complementary techniques: Mexican paintings from XIX century, colonial paintings (XVI-XVII century), pre-Hispanic and colonial manuscripts, pre-Hispanic metallic artifacts, and recently green stone and turquoise pre-Hispanic items, among others.

In this work, the main features of the SANDRA system are presented as well as two examples of research on Mexican cultural heritage collections.

First, the main results of the study of an important colonial manuscript of traditional medicine using herbals, the *de la Cruz-Badiano* codex, written in 1552 in the school for Indians of Santa Cruz de Tlatelolco during the early colonial period after the conquest of Mexico, is presented. XRF was used for the analysis of inks and colored figures.

On the other hand, the most outstanding results of a set of almost 50 pre-Hispanic artifacts of gold and silver artifacts discovered in the Tomb 7 of Monte-Alban, Oaxaca, one of the most important treasures discovered in Mexico. From XRF study, the alloys composition and some technological aspects are discussed.

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