

Investigation of Aluminum Species in Medicines and Supplements Using WD-XRF

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People generally use medicines and supplements that contain various chemicals in their daily lives. Especially gastrointestinal medicine is most heavily used. It generally contains aluminum which acts as an alkali to counteract stomach acid and make its pH more neutral. However, the severe toxic effects of aluminum poisoning have been reported for the past few decades. It was reported that the absorption rate of aluminum into blood depends on its chemical species. Therefore, it is necessary to investigate the concentration and chemical species of aluminum present in frequently used medicines. In the present study, the concentration and chemical species of aluminum in medicines and supplements available at a pharmacy were investigated using high-resolution X-ray fluorescence spectrometry. Sequential type high-resolution wavelength-dispersive X-ray fluorescence spectrometer (WD-XRF) from Bruker S8 Tiger model was used. The spectrometer was equipped with pentaerythritol (PET) crystal to disperse the fluorescence spectrum into individual wavelengths of each element, providing high resolution and low background spectra. Several aluminum compounds were used to identify the accurate species of aluminum present in the samples. As a result, the chemical compounds of aluminum (Al oxides, Al hydroxides, and Al phosphate) in the medicines were investigated by comparison with the energy distribution features of reference K_{α} and K_{β} emission spectra.

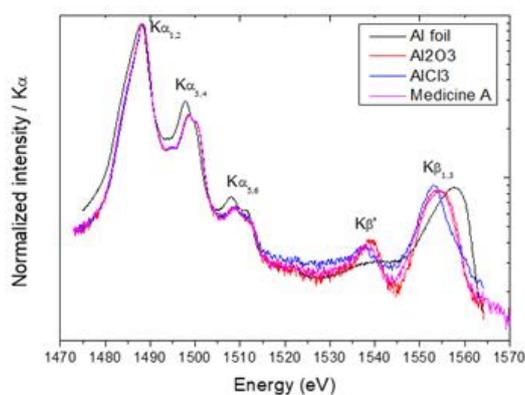


Fig. 1. K_{α} and K_{β} emission spectra of Al, Al compounds, and medicine A.

