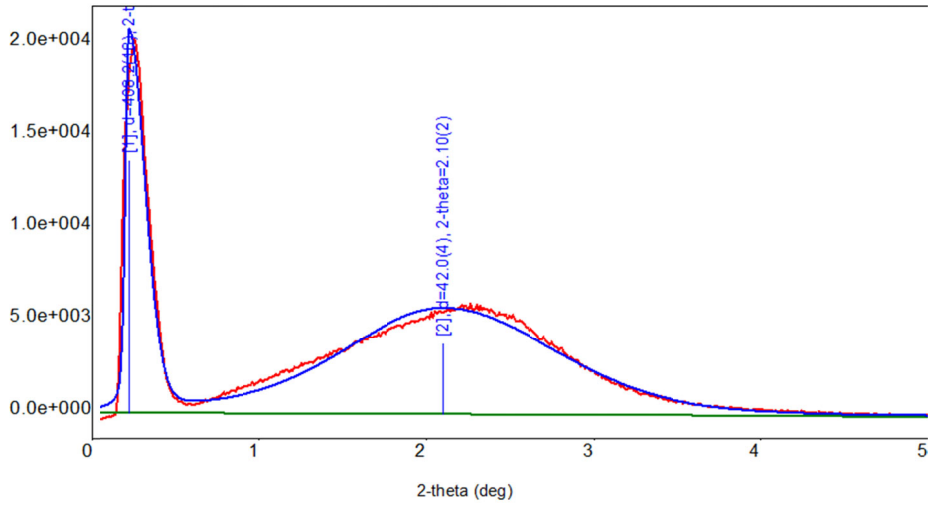

Figure 3 – Small-angle X-ray diffraction pattern of mesoporous aluminosilicate MAS-1

Figure 3 shows an X-ray diffraction pattern of small-angle scattering of a mesoporous sample MAS-1, according to which the presence of a pronounced peak in the 2.1° 2θ angular range indicates the presence of a mesoporous structure. For the MAS-1 sample, the intensity peak is in the 2.1 ° range, which at the wavelength of the radiation used corresponds to an interplanar distance of 4.2 nm.

DRIFT spectroscopy of adsorbed pyridine samples was performed in order to determine the relative strength of Brønsted and Lewis acid sites on the surface of mesoporous aluminosilicates (figure 4).

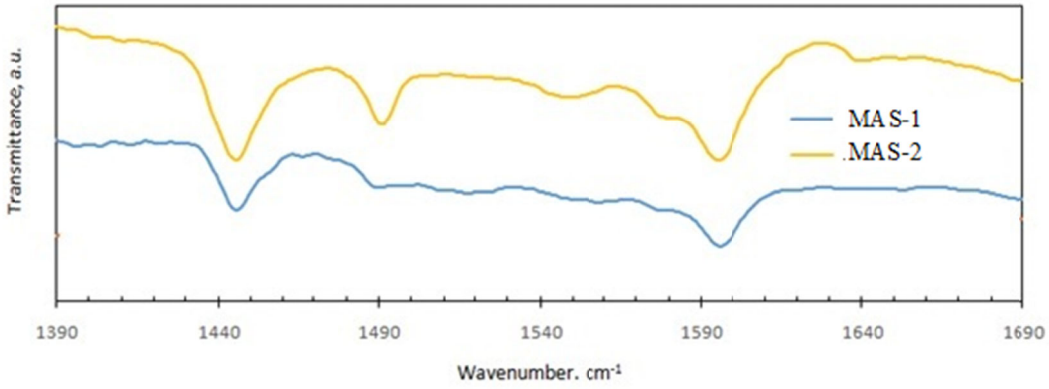

Figure 4 – Diffuse reflectance infrared Fourier transform (DRIFT) spectra of mesoporous aluminosilicates

The studied samples show absorption bands at 1445, 1490 and 1595 cm^{-1}. The observed bands at 1445 and 1595 cm^{-1} in the spectra are explained by the presence of hydrogen-bonded pyridine adsorbed on the centers of Lewis acids [17, 18]. The band observed at about 1490 cm^{-1} is due to the adsorption of pyridine, both at the Lewis centers and at the Brønsted acid sites. It should be noted that the appearance of an absorption band at 1640 cm^{-1} in the spectrum of the MAS-2 sample indicates the presence of Brønsted acid sites.

FT-IR spectroscopy was used to study the retention of crystalline ordering in the synthesized mesoporous aluminosilicates. FT-IR spectra of synthesized samples in the range of 400-4000 cm^{-1} are shown in figure 5. Fourier transform infrared spectroscopy (FTIR) complements X-ray diffraction in the search for modifications in crystallinity by comparing peak intensities in the range from 400 to 1300 cm^{-1} [19]. These bands are grouped into two types of vibrations of TO_4 tetrahedral units (where T = Al or Si): vibrations associated with connections between TO_4 tetrahedra, which are therefore sensitive to structural modifications, and vibrations of TO_4 tetrahedra, insensitive to structural modifications..