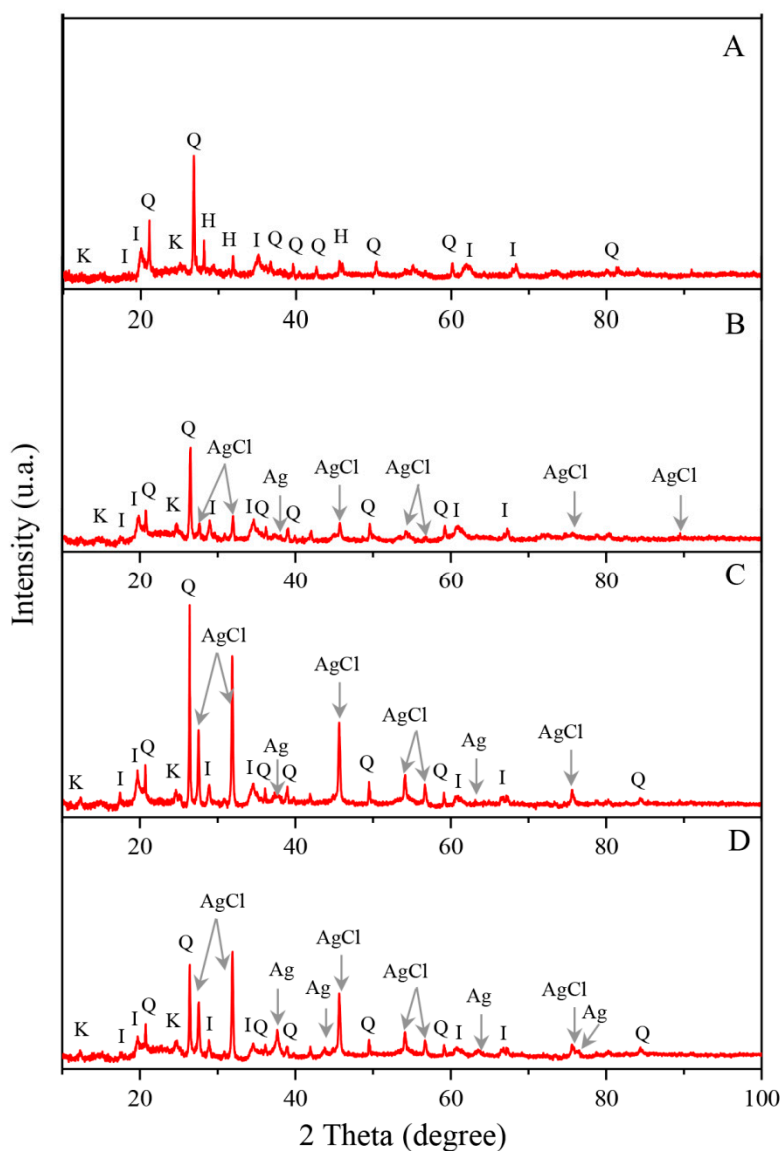


This phenomenon can be explained by the fact that the formation of AgCl-NPs in the synthesized composites is limited by the content of the halite mineral impurity in the diatomite structure.

### 3.2.2. Powder X-ray Diffraction Analysis

X-ray patterns of natural diatomite and (AgCl, Ag)NPs/diatomite composites are shown in Figure 4. X-ray spectra confirm the presence of both reduced metallic silver nanoparticles and silver chloride nanoparticles in all the synthesized composites. The presence of metallic silver nanoparticles is indicated by the appearance of four peaks with  $2\theta$  values of  $38.26^\circ$ ,  $44.45^\circ$ ,  $64.13^\circ$  and  $77.75^\circ$  (ref. code: 00-004-0783) corresponding to reflections of the crystallographic planes (111), (200), (220) and (311). The emergence of six diffraction peaks with  $2\theta$  values of  $27.96^\circ$ ,  $32.38^\circ$ ,  $46.37^\circ$ ,  $54.96^\circ$ ,  $57.59^\circ$  and  $76.84^\circ$ , corresponding to reflections of the crystallographic planes (111), (200), (220), (311), (222) and (420), points to the presence of nanoparticles of chloride of silver (ref. code: 00-006-0480). The bright intensity of reflections is due to the higher content of AgCl-NPs compared with metallic silver nanoparticles, as well as the greater stability of crystal forms of silver chloride nanocrystallites.



**Figure 4.** X-ray diffraction patterns of the studied diatomite samples: (A) raw diatomite, (B–D) diatomite with immobilized silver 0.71, 4.65 and 7.21%, respectively. I—illite, Q—quartz, K—kaolinite, H—halite, AgCl—silver chloride, Ag—metallic silver.