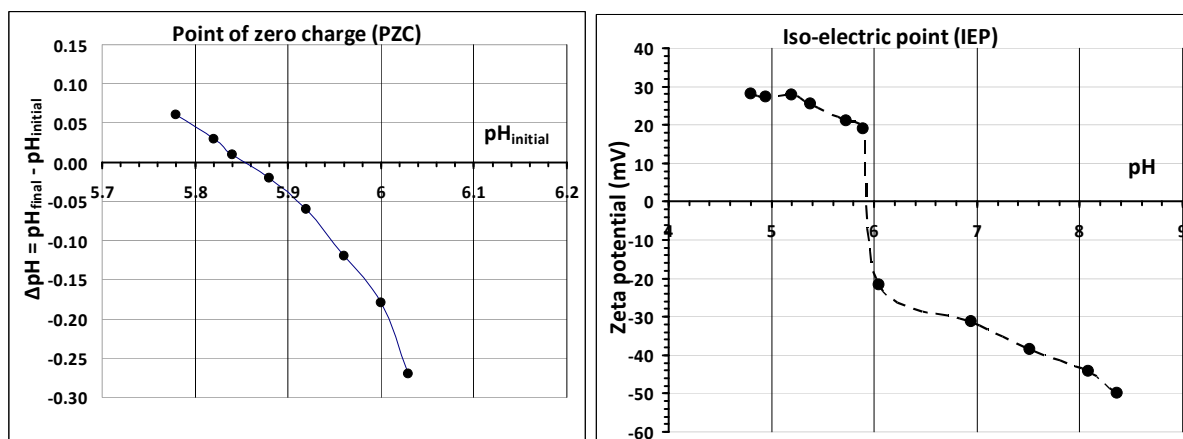
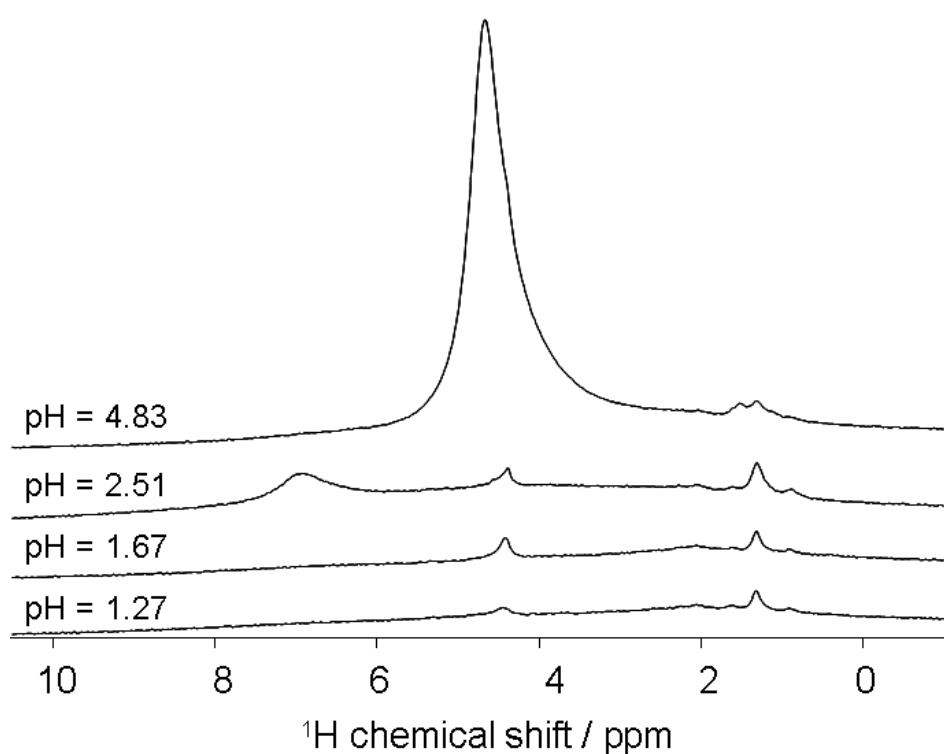


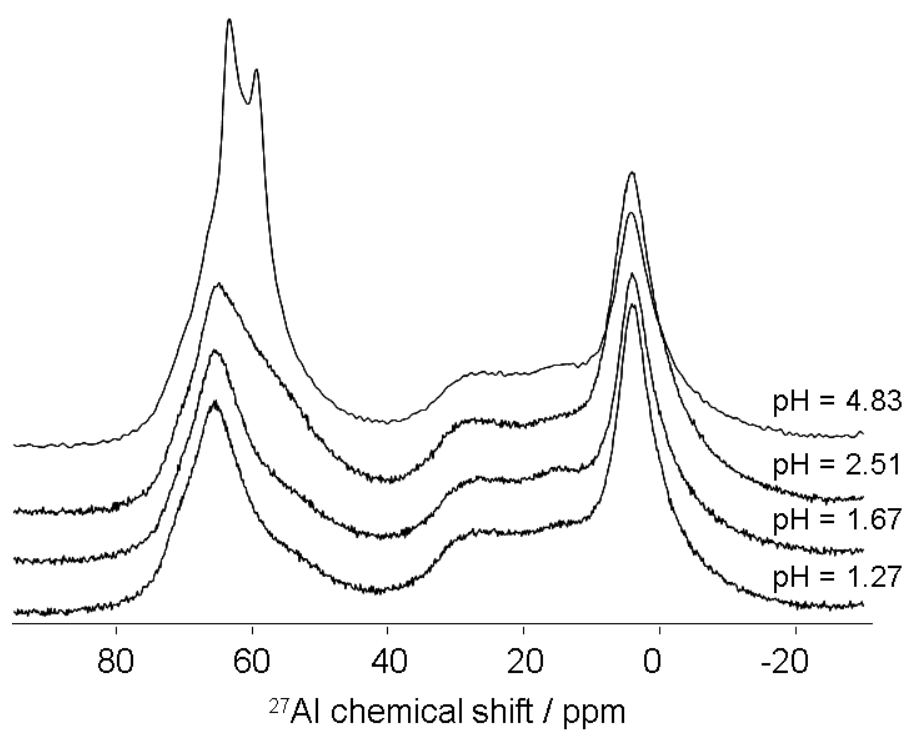
## Supplementary Materials (SM)



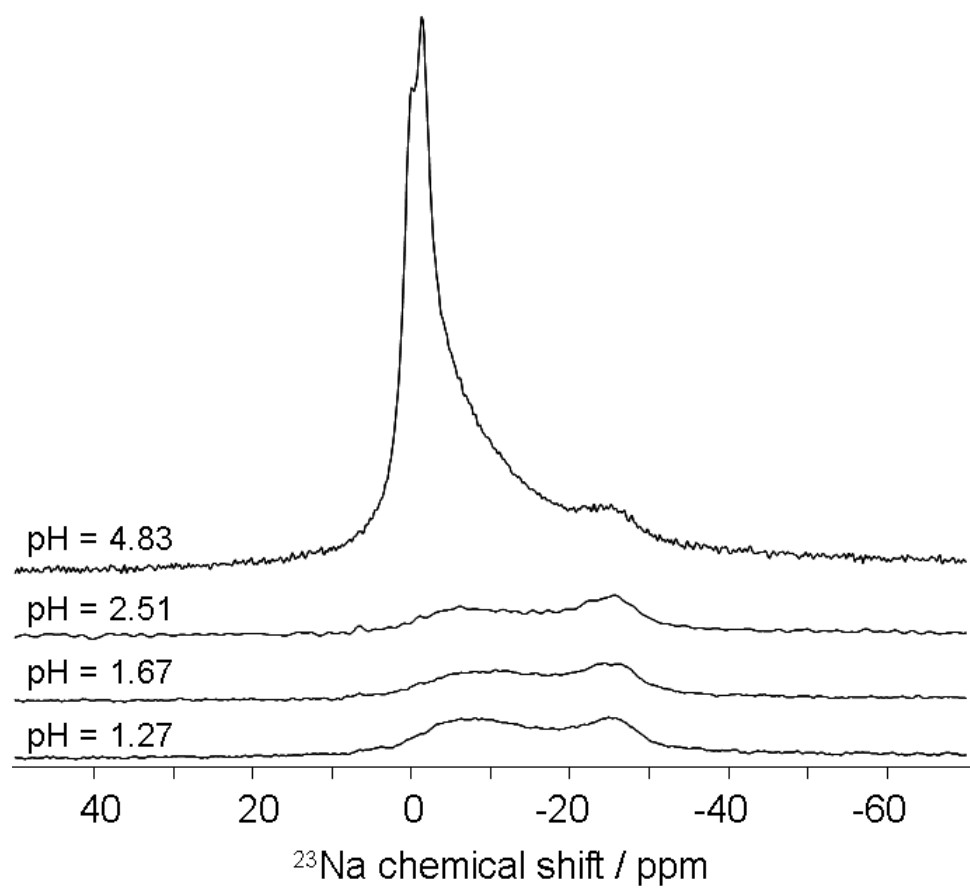
**Figure S1:** “ $\Delta pH$ ” variations versus “initial pH” for the determination of the pH at the point of zero charge of alkali brick by means of the salt-addition method. “Zeta potential” versus “suspension pH” for the determination of the pH at the iso-electric point of alkali brick by zetametry.



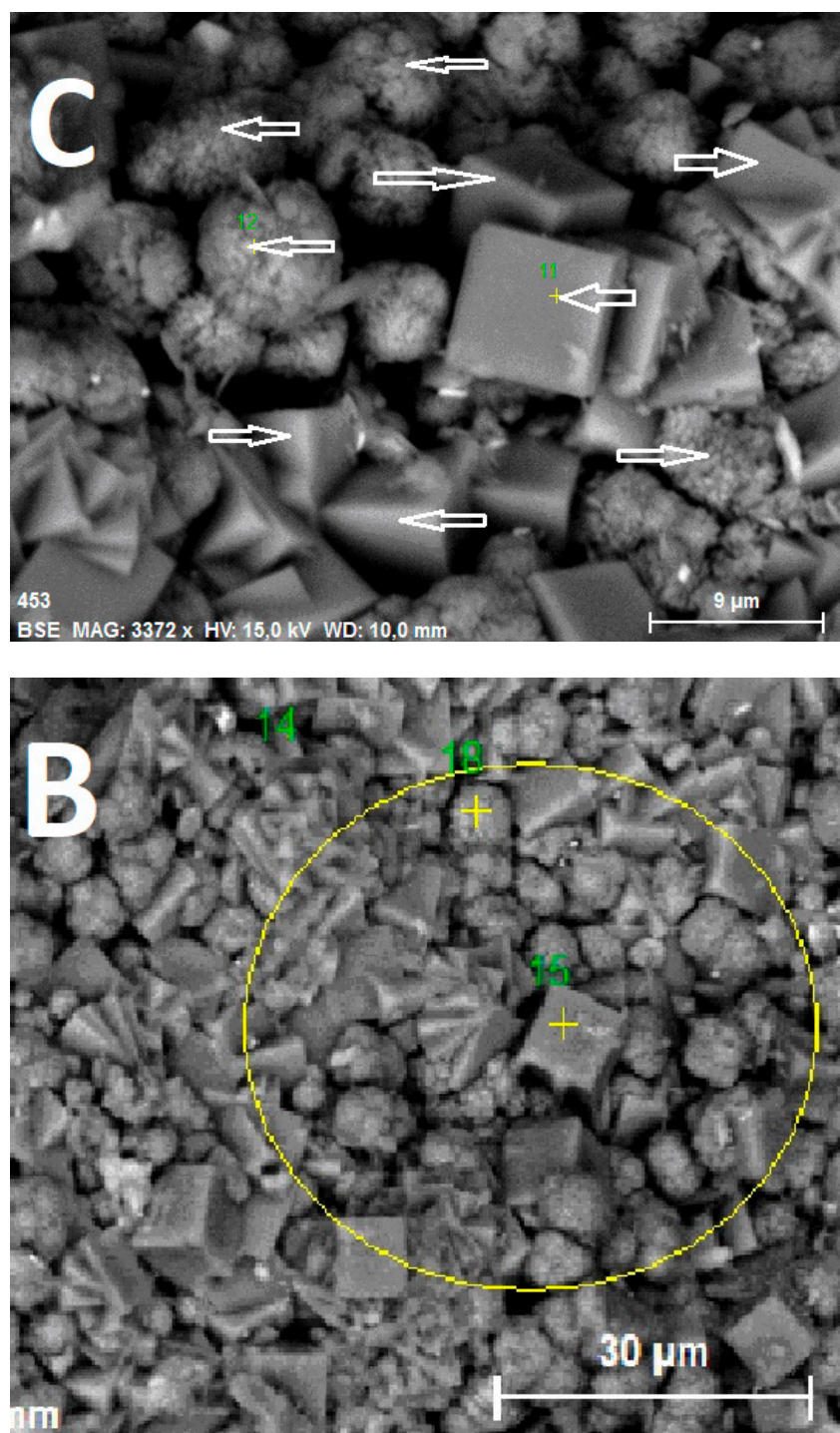
**Figure S2( $^1H$ ):**  $^1H$  MAS NMR spectra of alkali-brick grains after their acidification at different pH values ranging from 4.83 to 1.27.

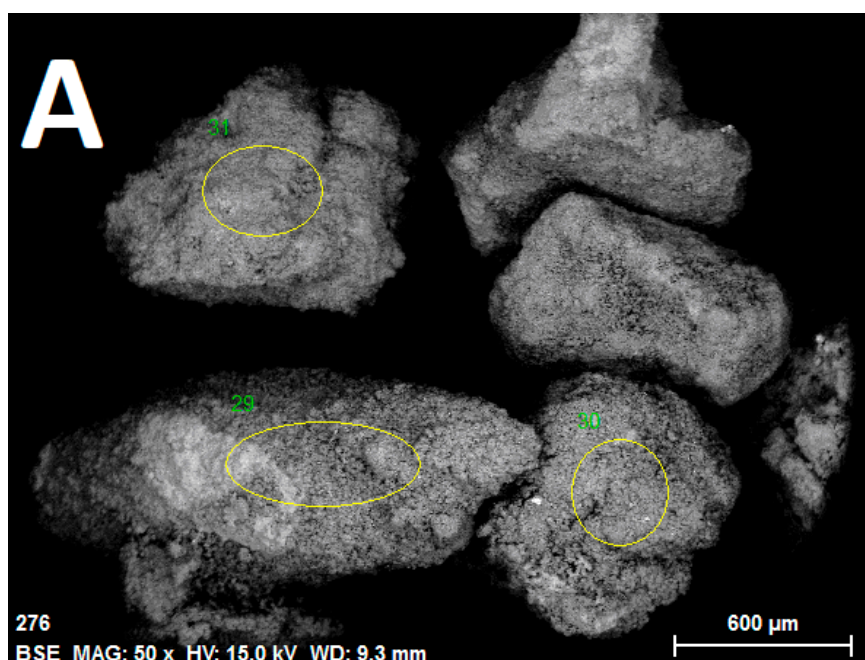


**Figure S2( $^{27}\text{Al}$ ):**  $^{27}\text{Al}$  MAS NMR spectra of alkali-brick grains after their acidification at different pH values ranging from 4.83 to 1.27.



**Figure S2( $^{23}\text{Na}$ ):**  $^{23}\text{Na}$  MAS NMR spectra of alkali-brick grains after their acidification at different pH values ranging from 4.83 to 1.27.





**Figure S3:** ESEM images of alkali-brick grains. Quantitative ESEM/EDS analyses performed on: large zones of surface aggregates ( $\sim 300\text{-}500\mu\text{m}$ ) \_\_ (A); zeolites-rich zones ( $50\text{-}60\mu\text{m}$ ) \_\_ (B); different targeted ‘zeolitic’ particles \_\_ (C).