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*Brønsted and Lewis acidity of protonic zeolites and other materials
based on silica and alumina*



UNIVERSITÀ DEGLI STUDI
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The origin and nature of the surface acidity of industrial solid acid catalysts based on silica, alumina and protonic zeolites is described and discussed, in relation to application to petrochemical and refinery processes. Protonic zeolites, i.e. those zeolites where protons act as balancing cations in the cavities of the negatively charged $[\text{Si}_{1-x}\text{Al}_x\text{O}_2]^-$, find industrial applications as acid catalysts in a large number of hydrocarbon conversion reactions because they are among the strongest protonic solid acids. The excellent activity of these materials is due to two main properties: the strong Brønsted acidity of bridging Si-(OH)-Al sites and shape selectivity effects due to the molecular sieving properties associated to the well defined crystal pore sizes, where the catalytic active sites are located.