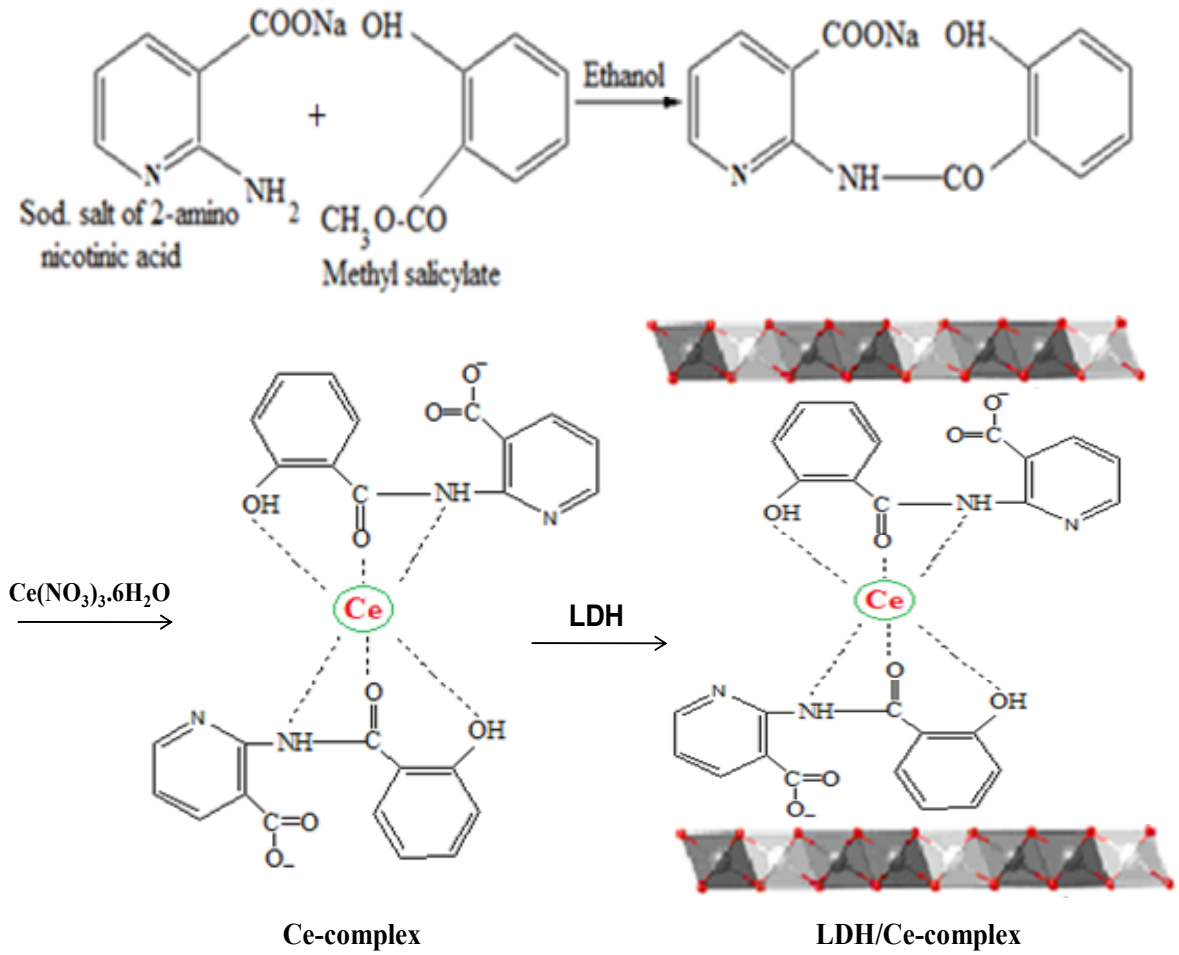
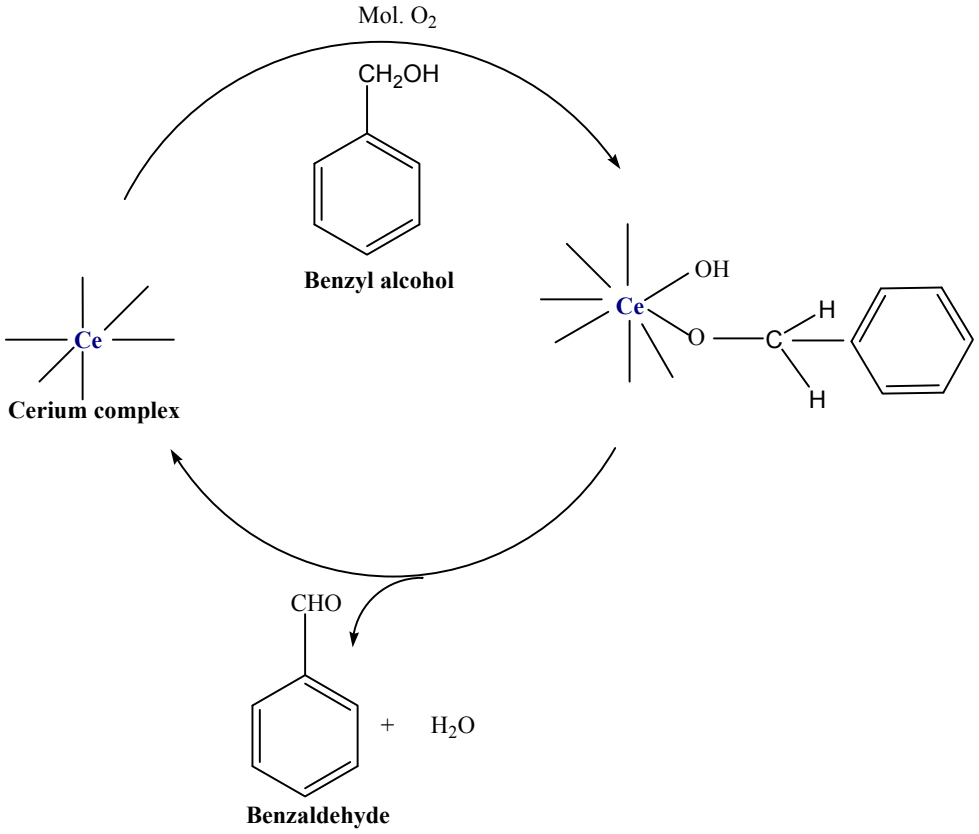
Supporting informations:



Scheme S1 Synthesis pathway for the formation of Ce-complex intercalated LDH

Possible mechanistic pathway

Scheme S2 represents the possible mechanistic pathway for alcohol oxidation (ex- benzyl alcohol). Reaction proceeds with oxidative addition of mol.O_2 to Ce-centre to form an oxo bridge complex which is unstable followed by addition of benzyl alcohol. Subsequent step involves the reductive elemination to form benzaldehyde.



Scheme S2 Plausible mechanistic pathway for benzyl alcohol oxidation

Scanning electron microscope studies

Figure S1 shows scanning electron micrographs of each of the catalysts prior to reaction. The unmodified LDH in Figure S1(a) has a conventional large-hexagonal plate like morphology with sharp edges. But in case of complex intercalated LDH, a slight defective image indicating flexibility of the host layer and intercalation of complex in the ion exchange process.

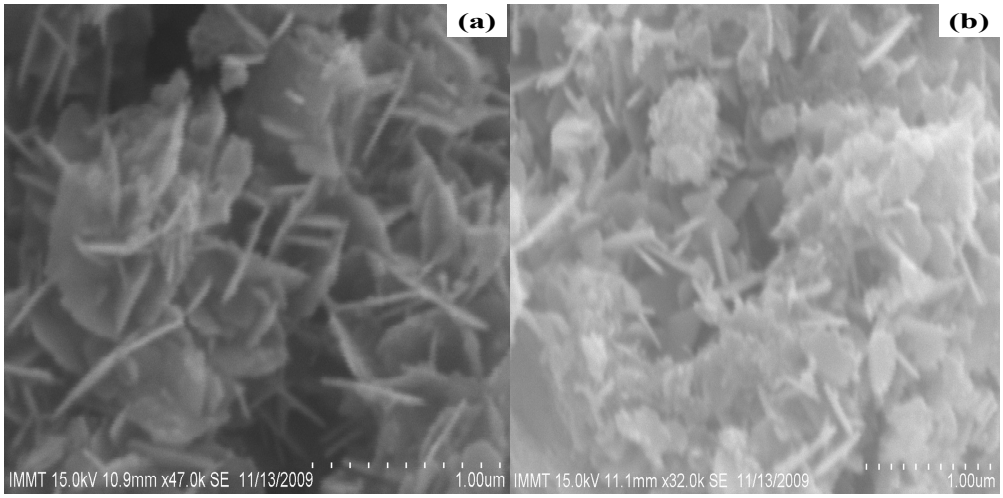


Fig. S1 SEM images of (a) Zn/Al-LDH (b) LDH/Ce-complex

Thermogravimetric analysis

Figure S2 shows the TGA curves of Zn/Al-NO_3 (solid line) and LDH/Ce-complex (dotted line). Generally, four steps are observed in the thermal evolution of LDH.[1] Desorption of physically adsorbed water, removal of interlayer structural water, dehydroxylation of the brucite-like sheets, and decomposition of the interlayer anions. The first weight loss for Zn/Al-NO_3 occurs from room temperature to 125 °C which is due to the removal of crystallization water (7%). A mass loss of 28.4% takes place in the temperature range 200-500 °C, attributed to decomposition of the brucite-like layer and removal of interlayer anions. A second step is observed from 175 to 230 °C, assigned to partial dehydroxylation of the double hydroxide layers. Complete dehydroxylation of the lattice takes place from 390 to 590 °C, accompanied by elimination/decomposition of the organic anion.

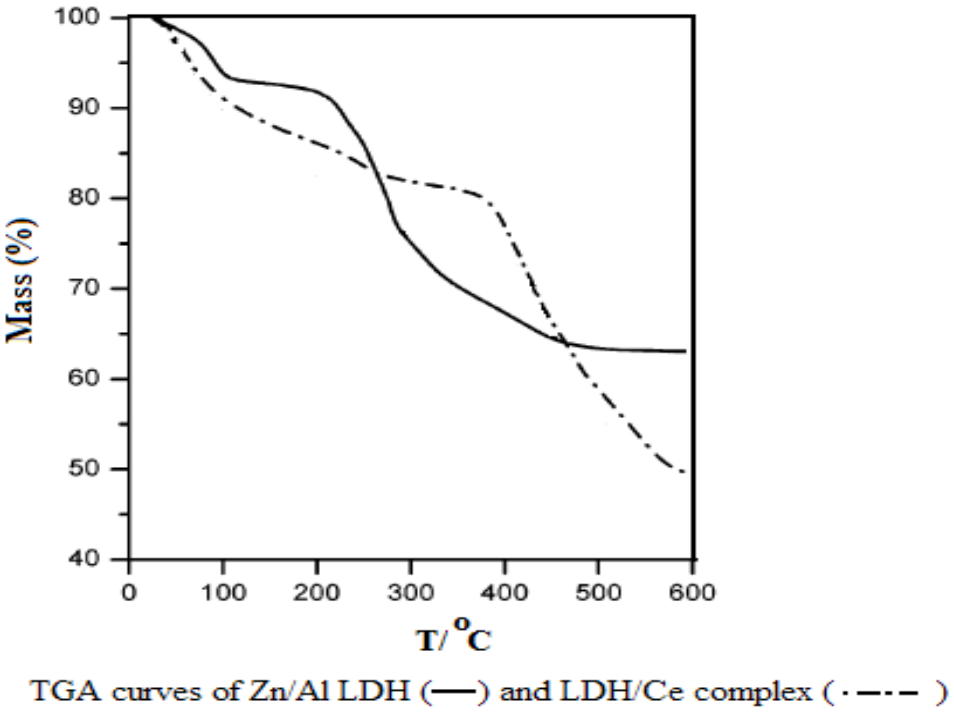


Fig. S2 TGA curves of Zn/Al-LDH (———) and LDH/Ce complex (— · —)

^{13}C CP MAS NMR spectra

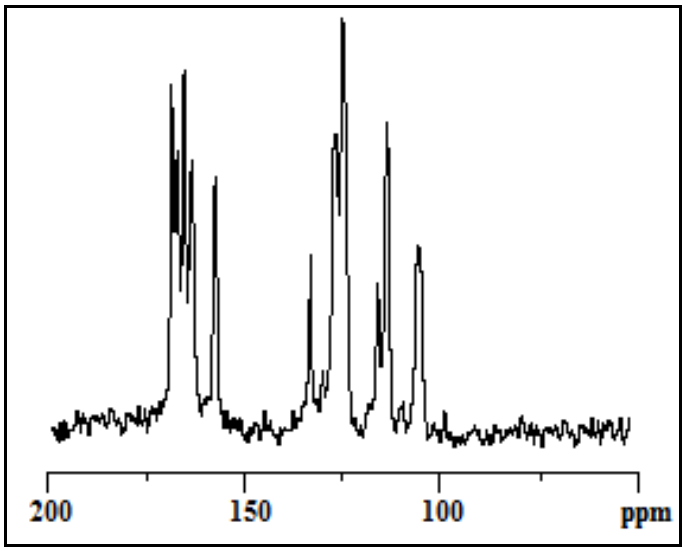


Fig. S3 ^{13}C CP MAS NMR spectra of Ce-complex

References

1 V. Rives, Layered Double Hydroxides: Present and Future; *Nova Science Publishers*: New York, 2001.