SUPPLEMENTARY INFORMATION

Sulfated/chlorinated Sr-Fe composite oxide as a novel solid and reusable superacid catalyst for oleic acid esterification

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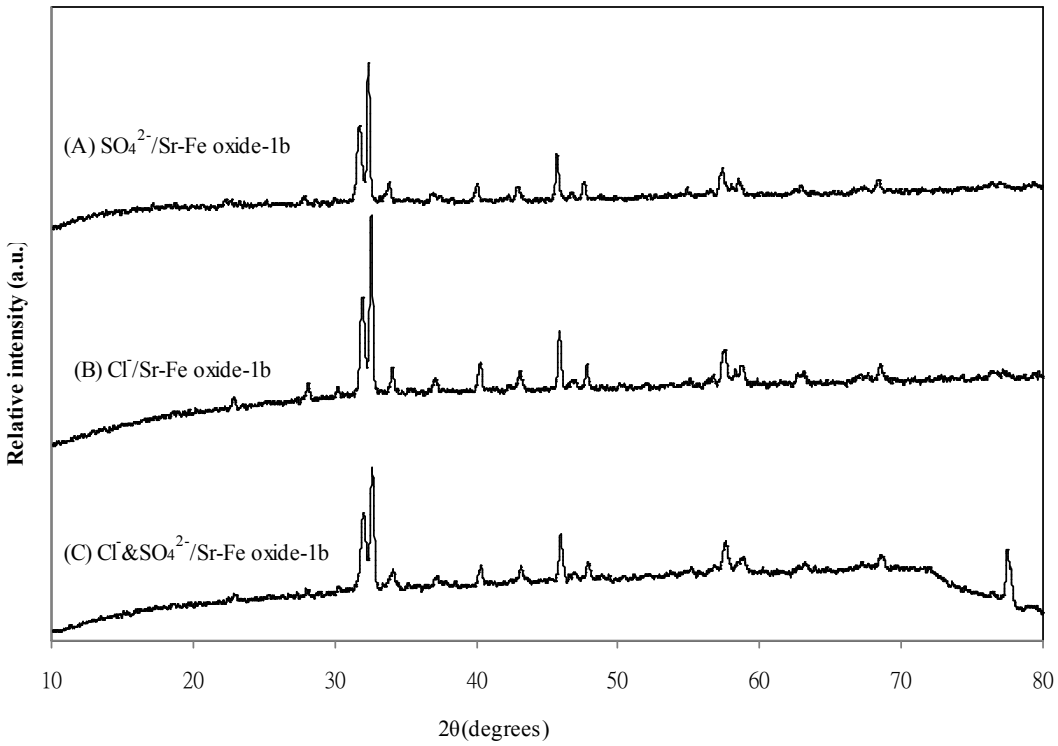

S1. Powder XRD pattern of the Sr-Fe oxide-1 modified with (A) Na_2SO_4 (SO_4^{2-}/Sr-Fe oxide-1b) (B) KCl (Cl^-/Sr-Fe oxide-1b) and Na_2SO_4 and KCl (Cl^-&SO_4^{2-}/Sr-Fe oxide-1b).

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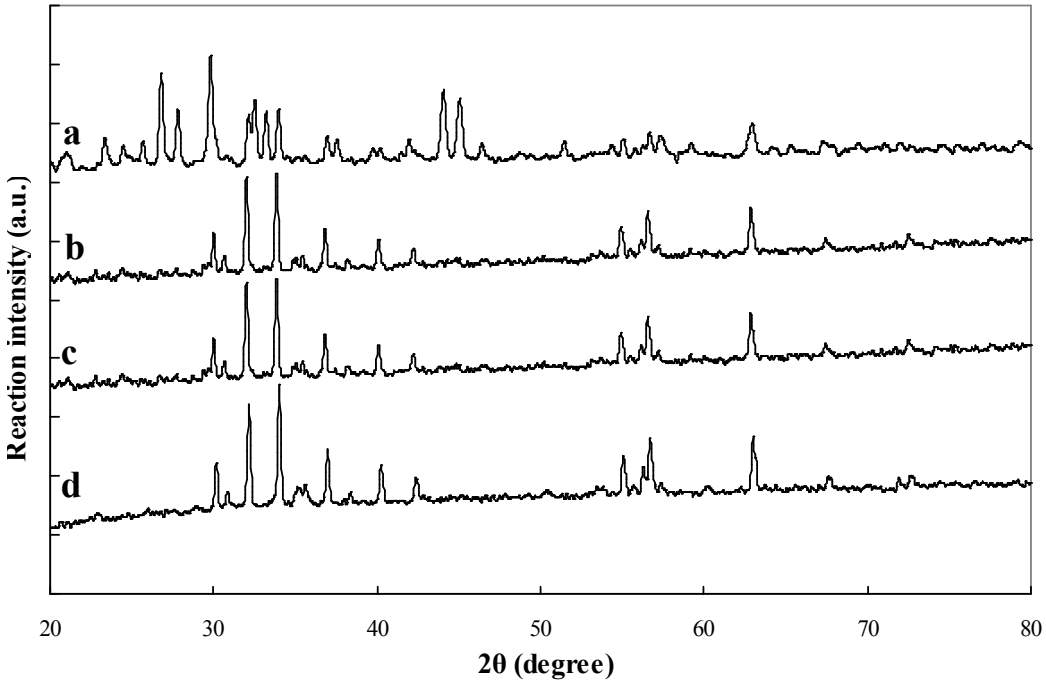
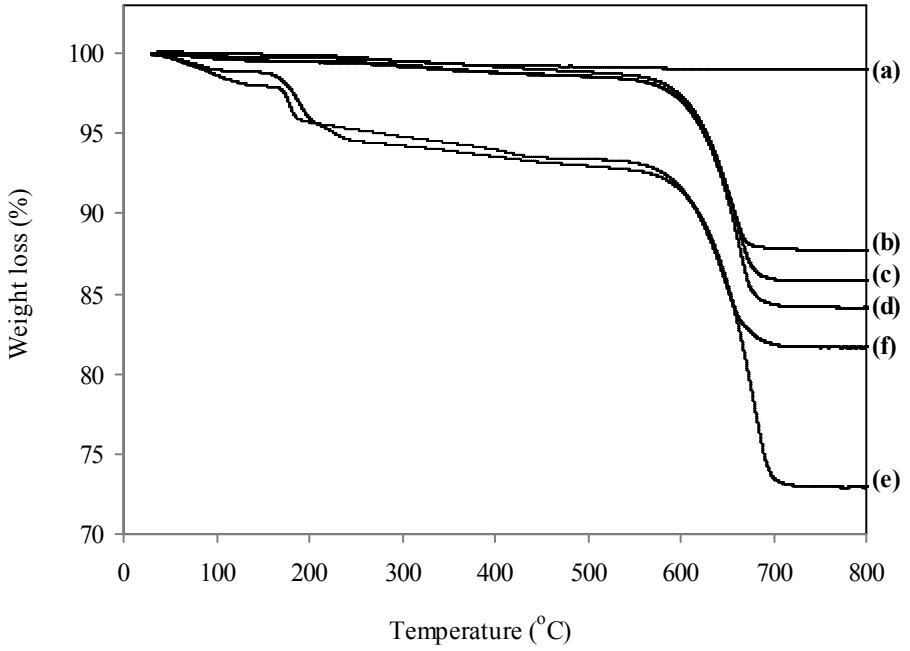


S2. The diffractogram of (a). $2MSO_4^{2-}$&$2MCl^-$/Sr-Fe oxide-1, (b). $2MSO_4^{2-}$-$2MCl^-$/Sr-Fe oxide-1 , (c). $2MCl^-$-$2MSO_4^{2-}$/Sr-Fe oxide-1 and (d). $2MCl^-$/Sr-Fe oxide-1



S3. TGA profiles of (a) Sr-Fe oxide-1 (b). $2MSO_4^{2-}$&0.1M Cl^-/Sr-Fe oxide-1, (c). $2MSO_4^{2-}$&$0.2MCl^-$/Sr-Fe oxide-1, (d). $2MSO_4^{2-}$&$0.5MCl^-$/Sr-Fe oxide-1 (e). $2MSO_4^{2-}$&$1MCl^-$/Sr-Fe oxide-1 and (f). $2MSO_4^{2-}$&$2MCl^-$/Sr-Fe oxide-1.

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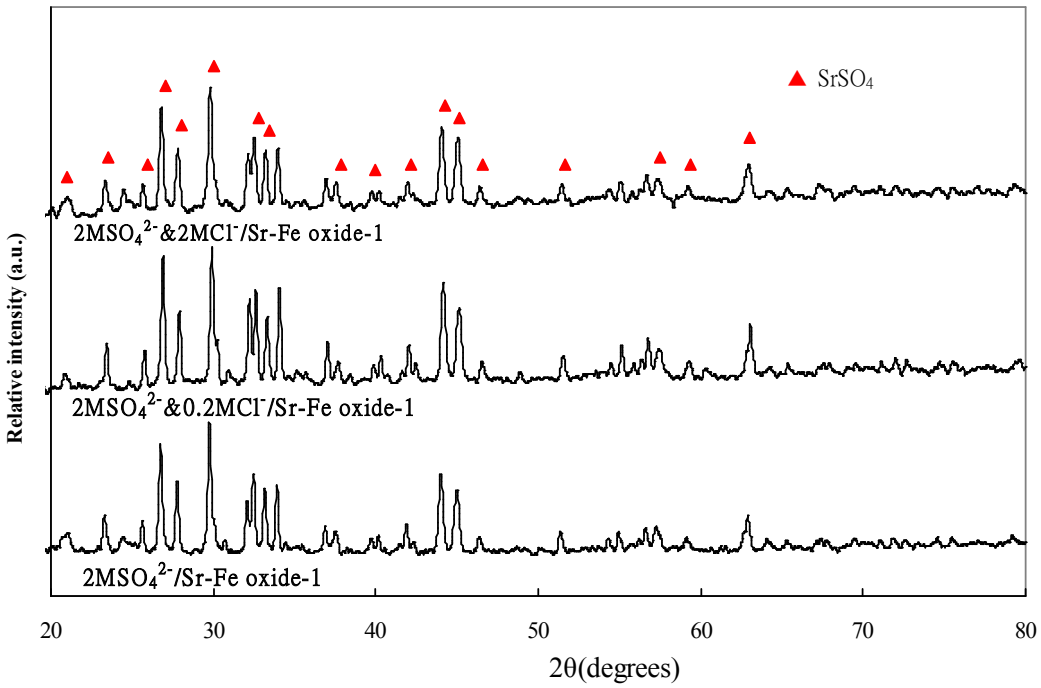
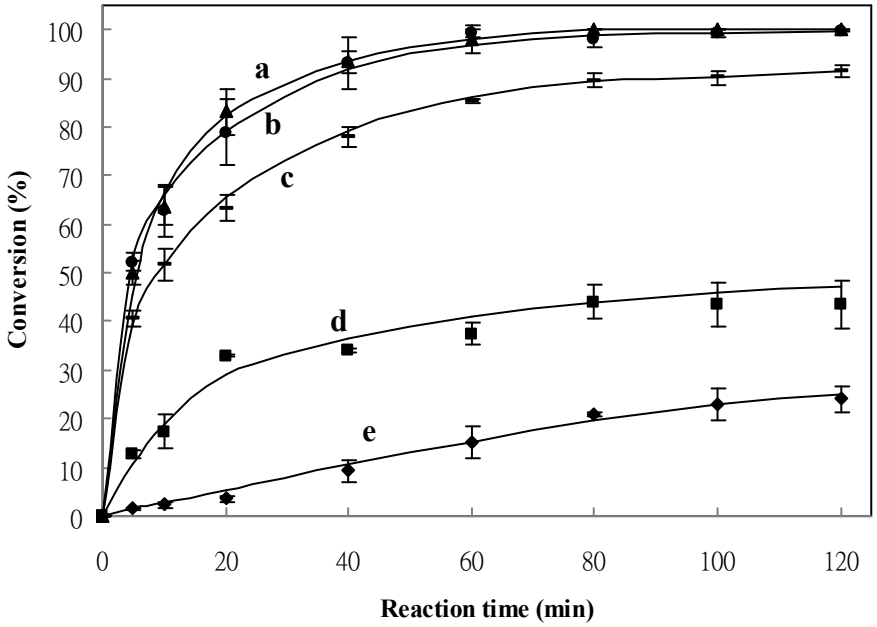
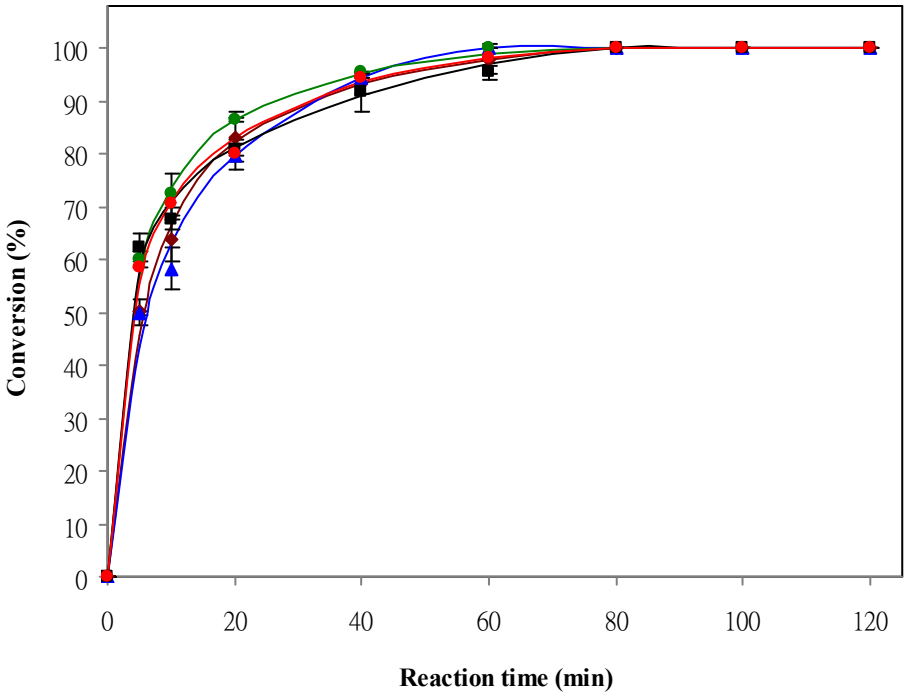


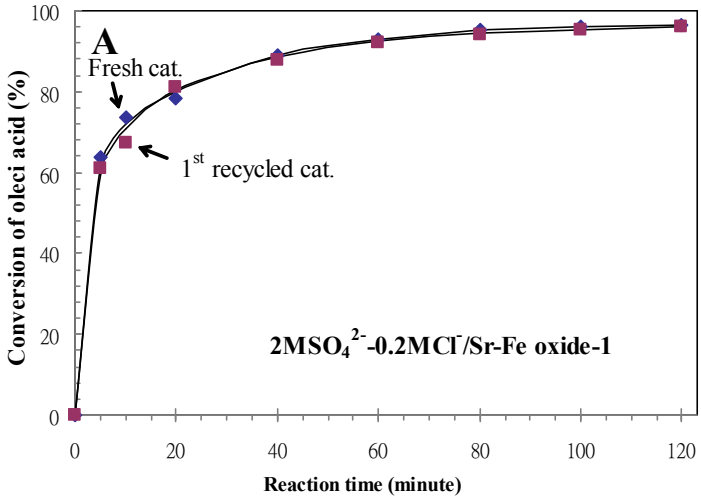
S4. XRD patterns of $2MSO_4^{2-}$/Sr-Fe oxide-1, $2MSO_4^{2-}$&0.2MCl^-/Sr-Fe oxide-1 and $2MSO_4^{2-}$&2MCl^-/Sr-Fe oxide-1.

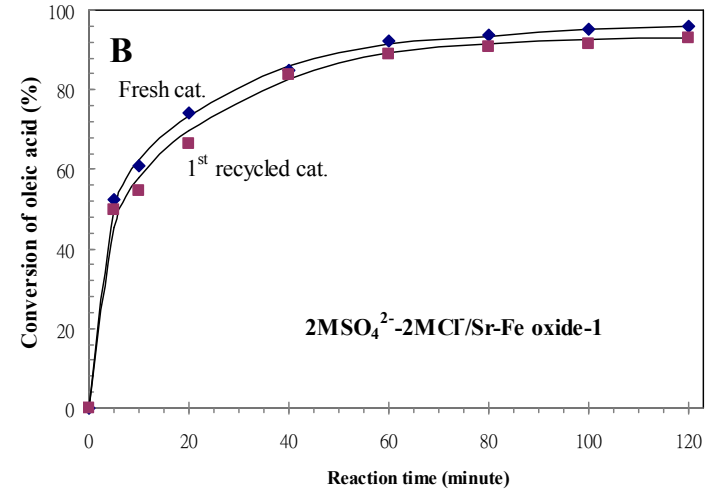


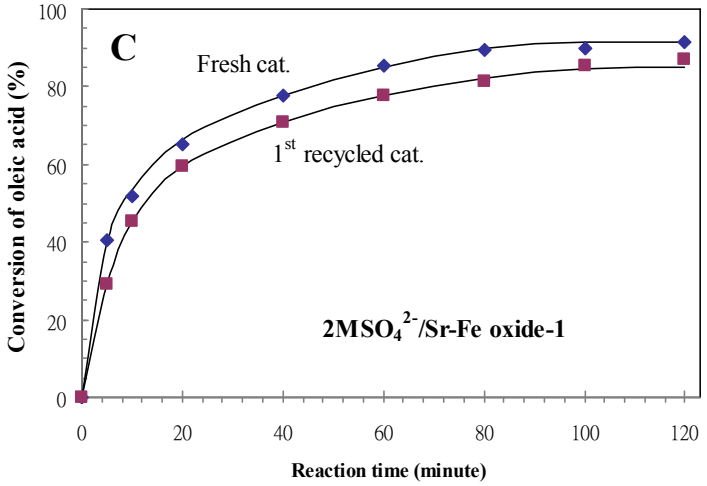
S5. Conversion versus reaction time for oleic acid esterification catalyzed by (a). $2MSO_4^{2-}$&2MCl^-/Sr-Fe oxide-1, (b). 2MCl^--$2MSO_4^{2-}$/Sr-Fe oxide-1, (c). $2MSO_4^{2-}$/Sr-Fe oxide-1, (d). $2MSO_4^{2-}$-2MCl^-/Sr-Fe oxide-1 and (e). 2MCl^-/Sr-Fe oxide-1 at 100^{o}C.



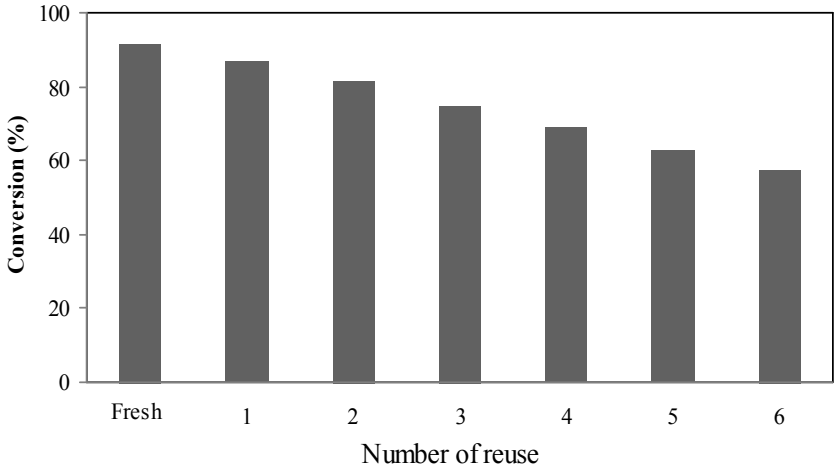
S6. Conversion versus reaction time for oleic acid esterification catalyzed by ◆ $2MSO_4^{2-}$&$2MCl^-$/Sr-Fe oxide-1, ▲ $2MSO_4^{2-}$&$1MCl^-$/Sr-Fe oxide-1, ◆$2MSO_4^{2-}$ &$0.5MCl^-$/Sr-Fe oxide-1, ■ $2MSO_4^{2-}$&$0.2MCl^-$/Sr-Fe oxide-1 and ● $2MSO_4^{2-}$ &$0.1MCl^-$/Sr-Fe oxide-1 at 100°C.



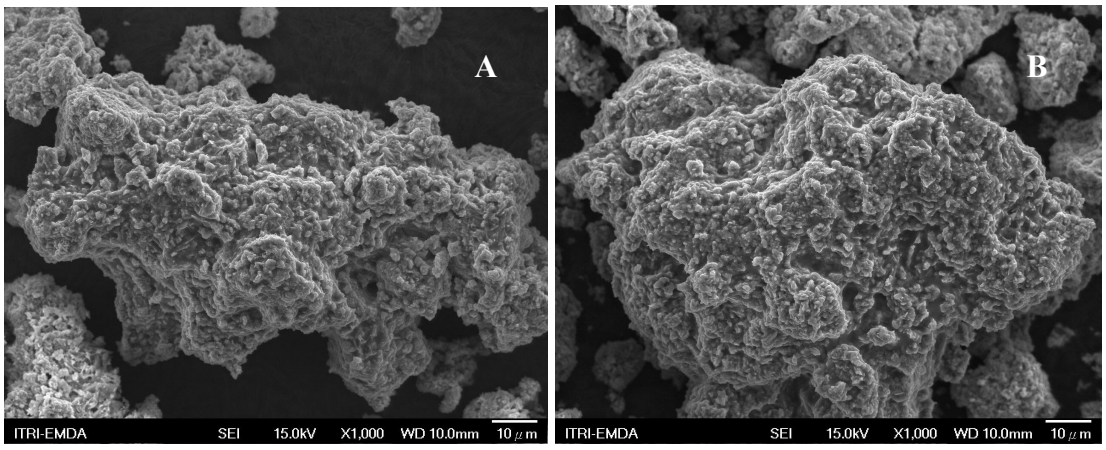




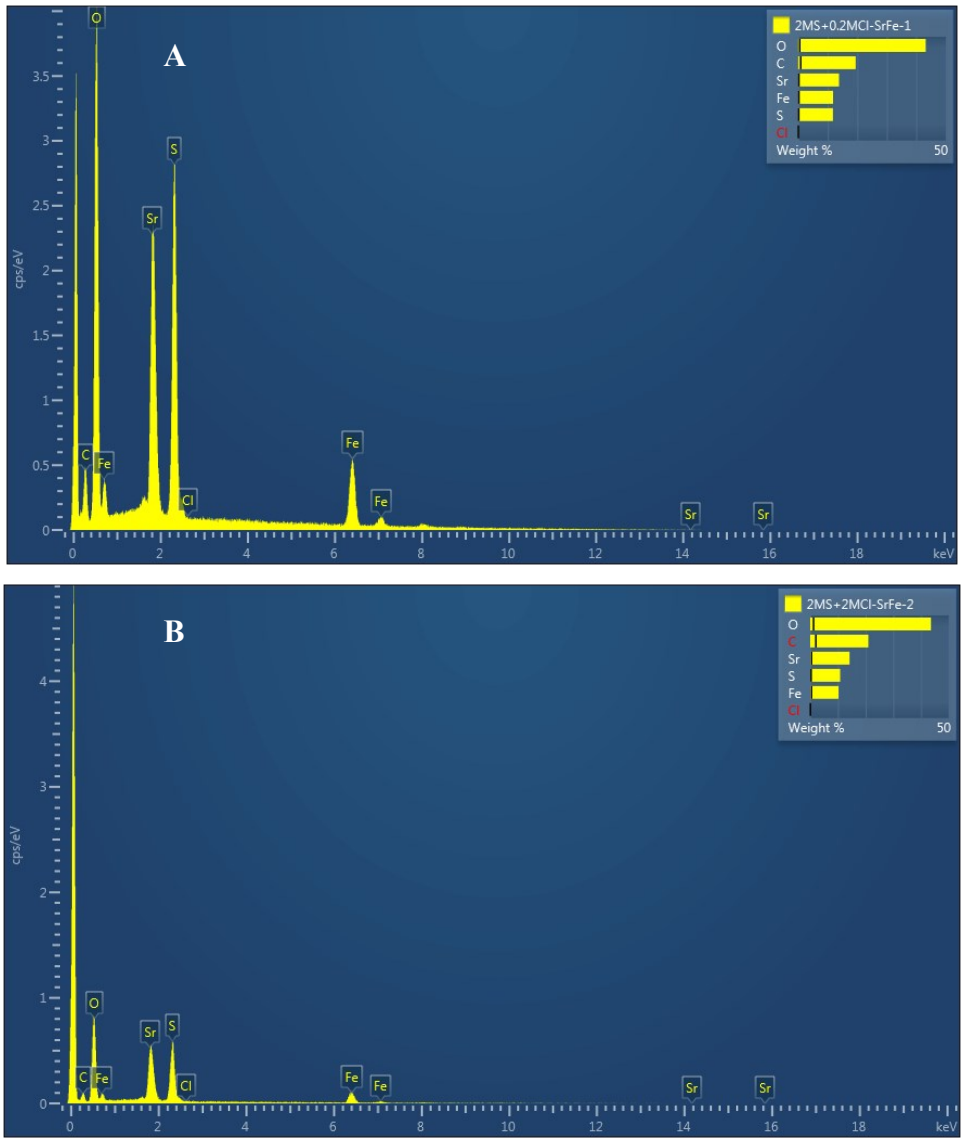
S7. Catalytic conversion of oleic acid over fresh and 1st recycled (A). $2MSO_4^{2-}$ &0.2MCl^-/Sr-Fe oxide-1, (B). $2MSO_4^{2-}$&2MCl^-/Sr-Fe oxide-1 and (C). $2MSO_4^{2-}$/Sr-Fe oxide-1 as a function of reaction time. (Reaction temperature = 100°C).



S8. Stability studies of SO_4^{2-}/Sr-Fe oxide-1 in catalyzing the esterification of oleic acid with methanol.



S9. SEM images of (A). $2MSO_4^{2-}$&0.2MCl^-/Sr-Fe oxide-1 and (B). $2MSO_4^{2-}$&2MCl^-/Sr-Fe oxide-1



S10. surface-elemental mapping results of (A). $2MSO_4^{2-}$&0.2MCl^-/Sr-Fe oxide-1 and (B). $2MSO_4^{2-}$&2MCl^-/Sr-Fe oxide-1