

***Ex-situ* Exsolved Ni-Ru Alloy from Nickel-Ruthenium co-doped SrFeO_{3-δ} Perovskite as a Potential Catalyst for C=C and C=O Hydrogenation**

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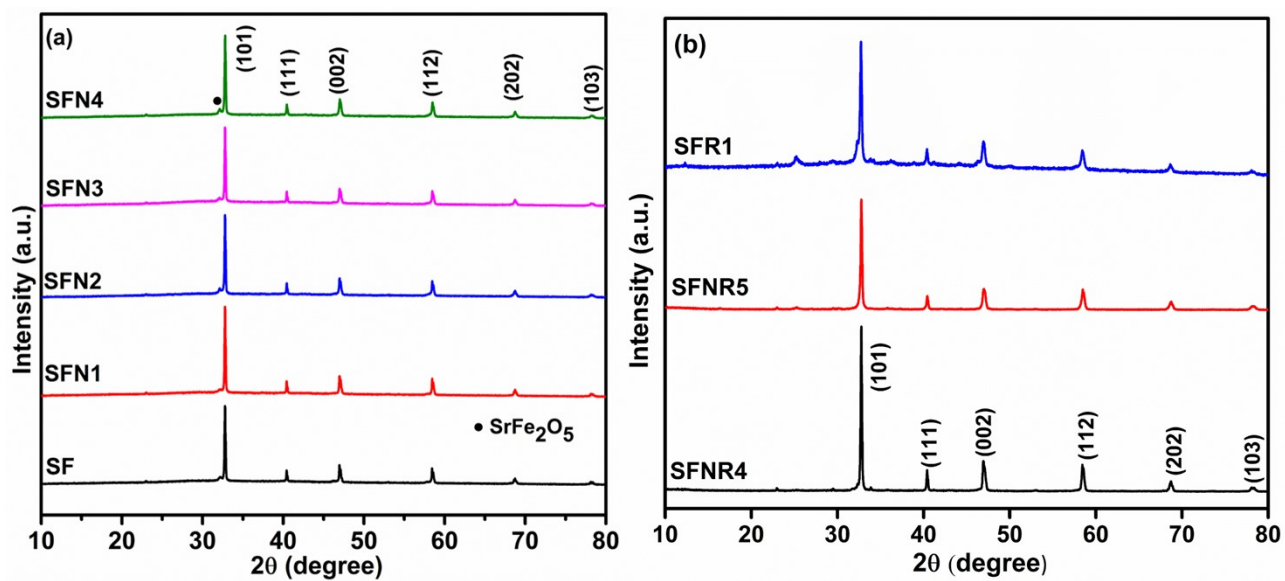


Fig. S1: Powder XRD pattern of annealed (a) SF and SFNx and (b) SFNRx and SFR1 samples.

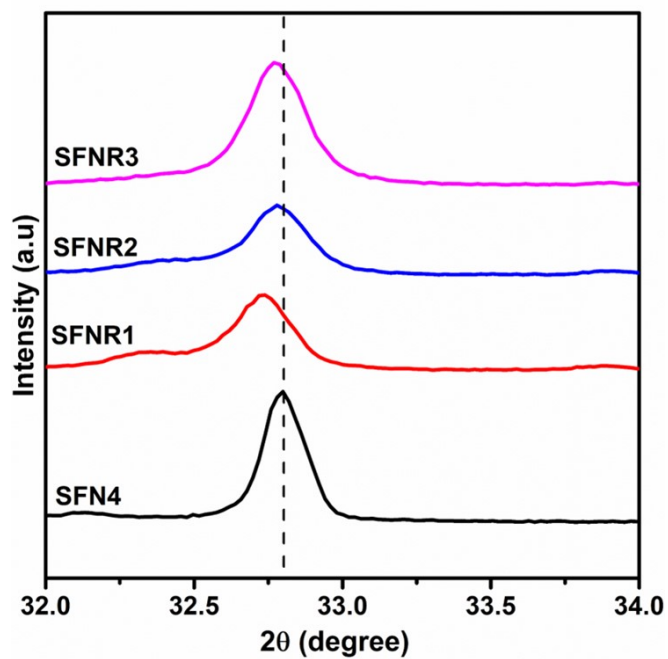


Fig. S2: Powder XRD pattern of annealed samples.

Sl.No.	Sample	Lattice parameter a (Å)	Unit cell volume V (Å ³)	Average crystallite size D (nm)
1	SF	3.861(1)	57.56(2)	46.0
2	SFN4	3.861(1)	57.58(2)	39.9
3	SFNR1	3.863(6)	57.68(9)	20.5
4	SFNR2	3.862(5)	57.61(7)	19.9
5	SFNR3	3.863(2)	57.68(3)	23.8
6	SFR1	3.864(4)	57.70 (7)	27.5

Table S1: Structural parameters of different synthesized samples.

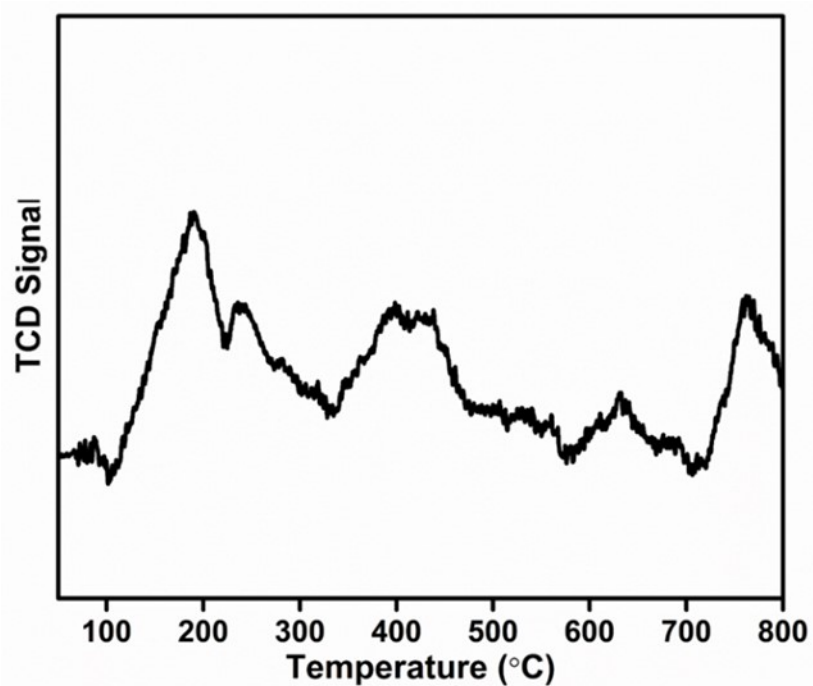


Fig. S3: TPR profile of SFNR1R.

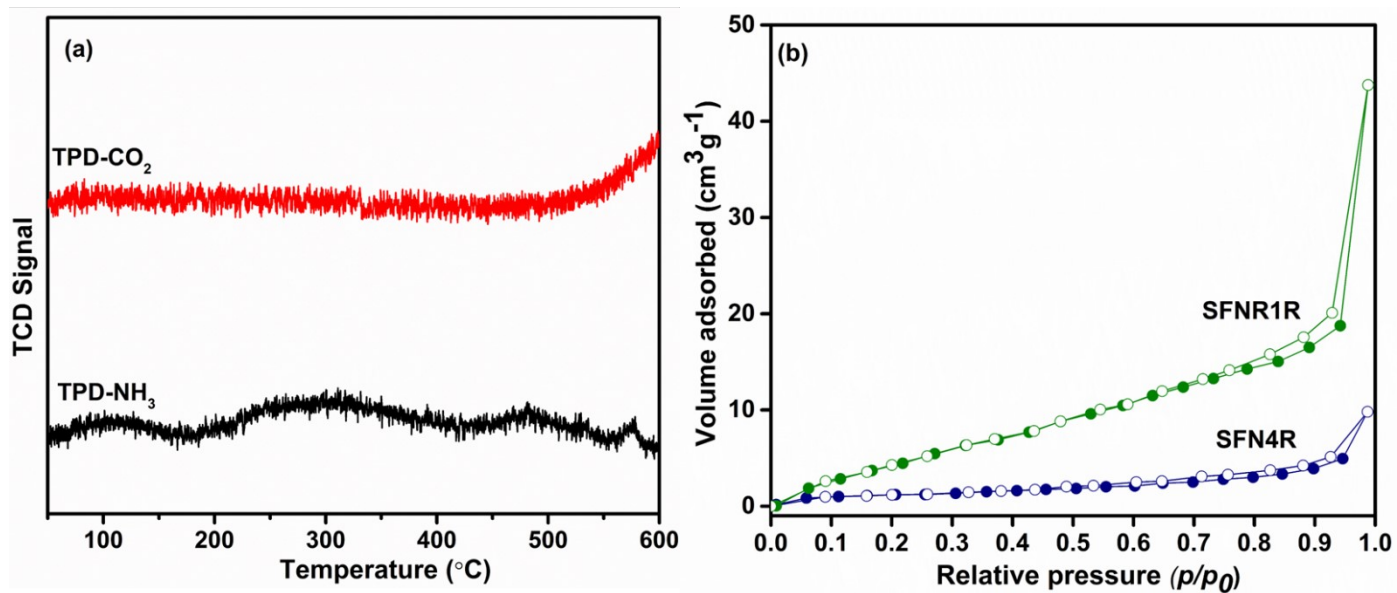


Fig. S4: (a) TPD profile of SFNR1R and (b) N₂ sorption isotherms of reduced samples.

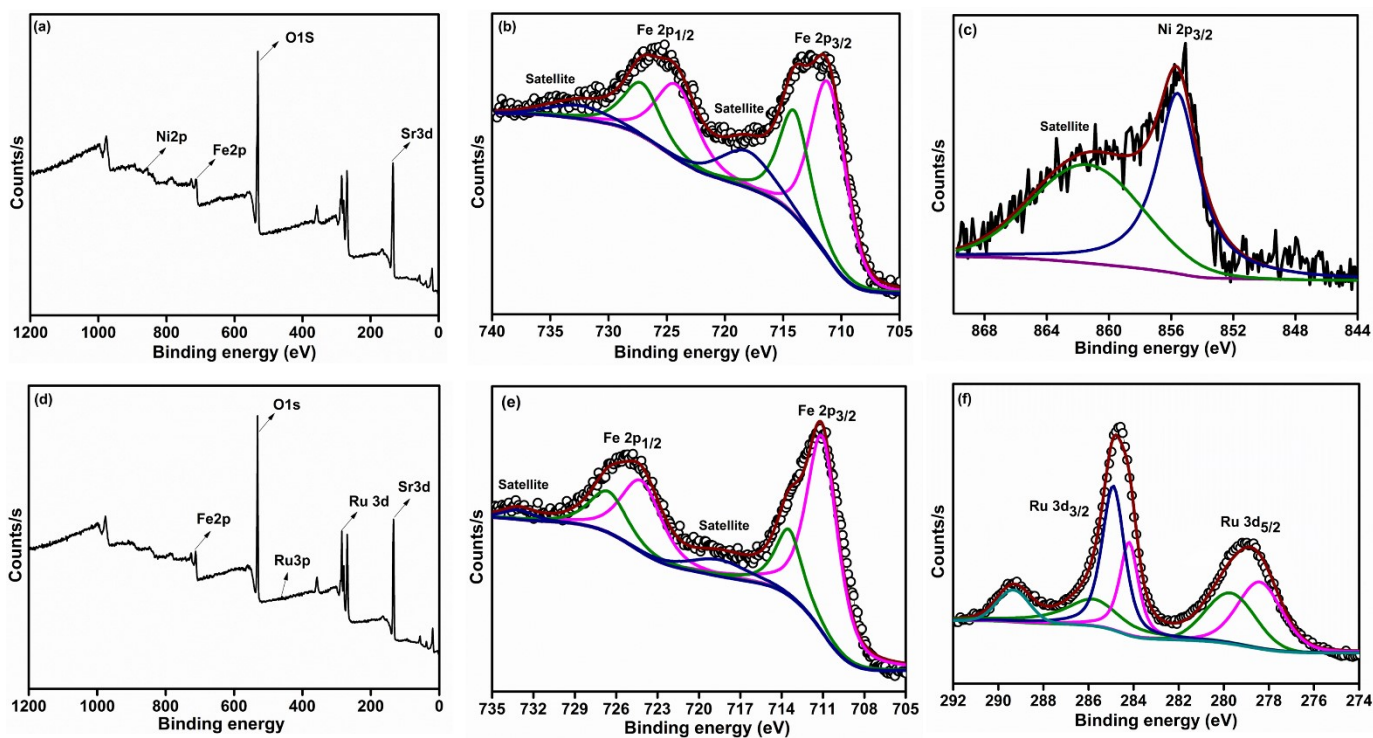


Figure S5: XPS profile of SFN4R- (a) survey spectrum, b) Fe 2p and c) Ni 2p; of SFR1R -d) survey spectrum, e) Fe 2p and f) Ru 3d.

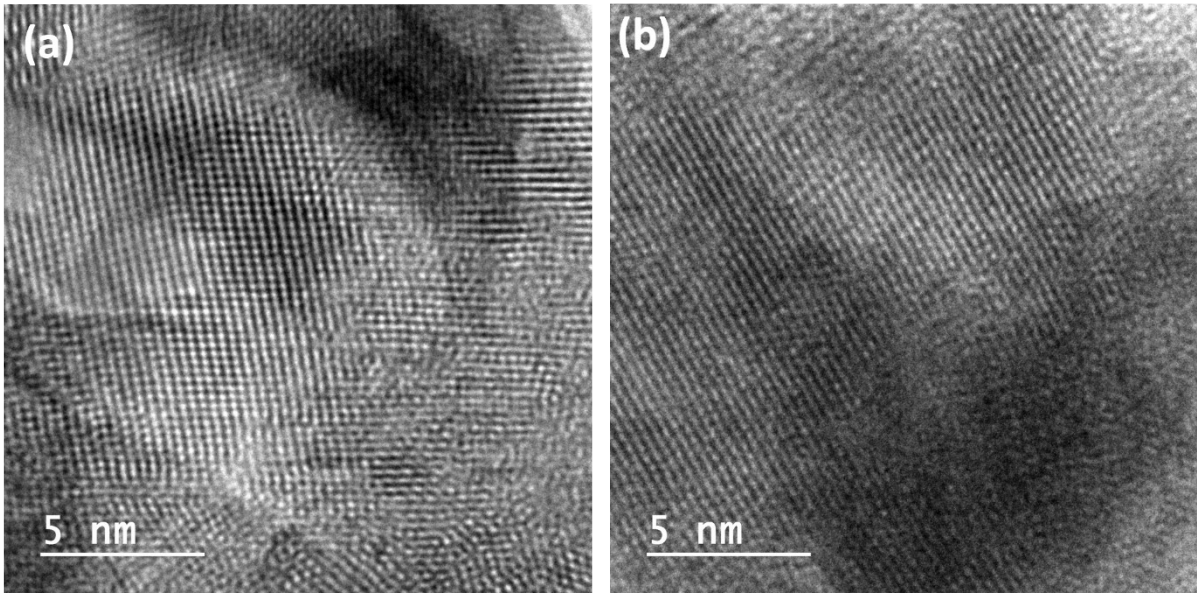


Figure S6: TEM images of (a) SFN4R and (b) SFR1R catalyst.

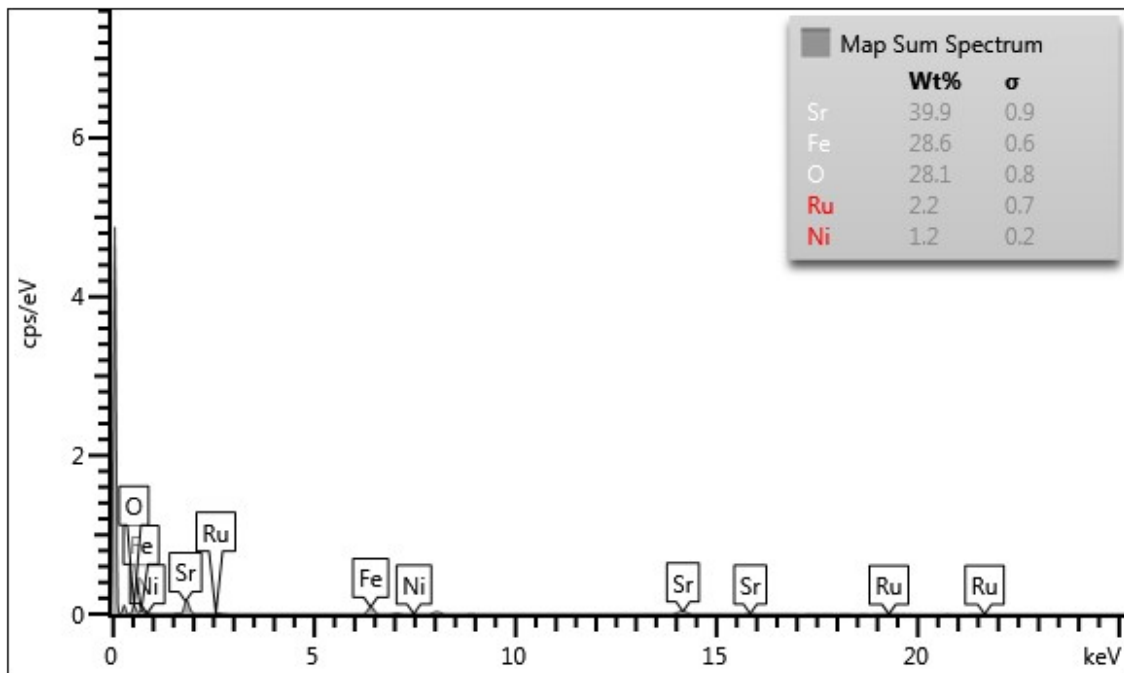


Fig. S7: Elemental composition from TEM analysis.

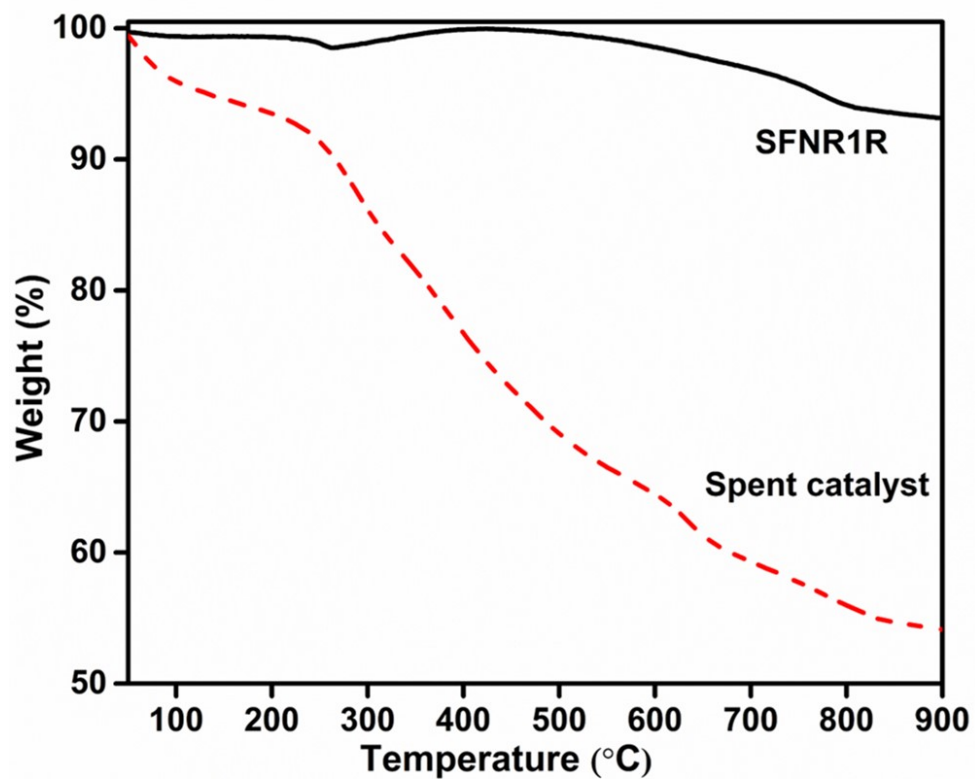


Fig. S8: TGA profile of fresh and spent SFNR1R catalyst in N₂ atmosphere.

Table S2: Comparison of furfural hydrogenation over SFNR1R catalyst with other Ni and Ru and perovskite catalyst reported in literature.

Sl.No.	Catalyst	Reaction condition	Conversion (%)	Selectivity of FOL (%)	Reference
1	SFNR1R	2 mmol furfural, 2mL <i>iso</i> -propanol, 10 bar H ₂ , 160 °C, 6h	99	91	Present study
2	MANR2-HT	1 mmol furfural, 5mL <i>iso</i> -propanol, 10 bar H ₂ , 150 °C, 6h	100	86	26
3	Ru/Zr-MOFs	100μL of furfural in 9.9 mL of H ₂ O, 5 bar H ₂ , 20 °C, 4 h	94.9	100	43
4	Ni ₃ Fe ₁ /SiO ₂	6g furfural, 100 mL methanol, 140°C, 34 bar H ₂ , 5h	100	96.5	44
5	Fe promoted Ni-B amorphous alloy	10 mL furfural, 30 mL ethanol, 100°C, 10 bar H ₂ , 4h	85	100	45
6	9.89wt% Ru/SiO ₂	10.86 mmol furfural, 50 mL Toluene, 25 bar H ₂ , 100 °C, 5h	75	98	46
7	Porous LaFeO ₃	35 μL of furfural, 15mL <i>iso</i> -propanol, 10 bar N ₂ , 180 °C, 3h	90	94	47
8	Ov-rich meso LaMnO ₃	0.42mmol of furfural, 15mL <i>iso</i> -propanol, 10 bar N ₂ , 180 °C, 3h	99	96.1	48
9	NiO-(meso)	5 mmol furfural, 5 mL <i>iso</i> -propanol, 20 bar H ₂ , 150 °C, 5h	73	100	49
10	RuS ₃	1 atm H ₂ , 160 °C, 4h	100	99	50