SUPPORTING INFORMATION

Storage material effects on the performance of Ru-based CO_2 capture and methanation dual functioning materials (DFM)

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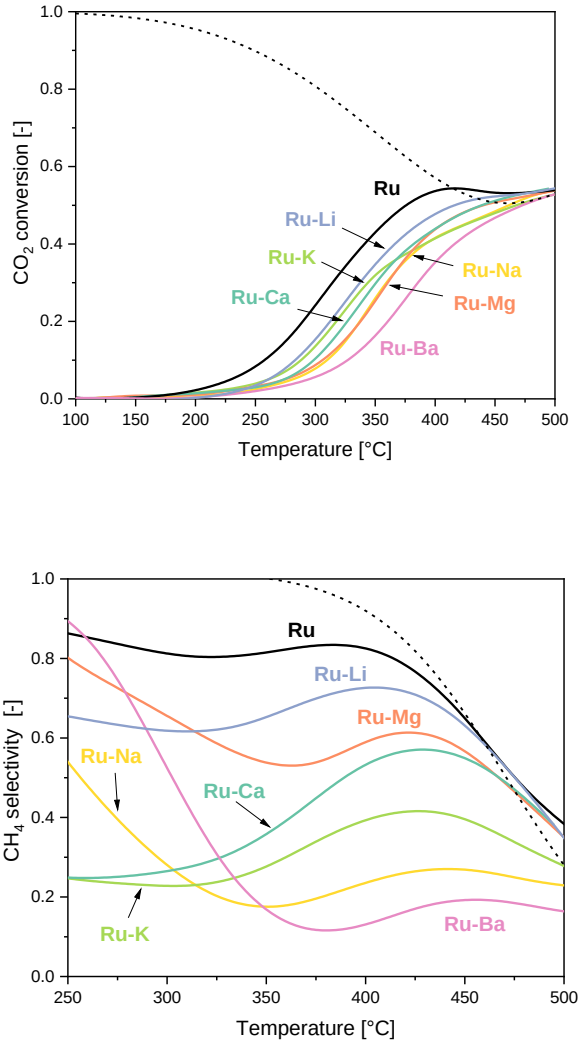

Fig. S1. Co-feeding tests on 60 mg of each prepared material. P = 1 ata, $H_2/CO_2/He$ = 4/1/95, Flowrate = 100mL(STP)/min.

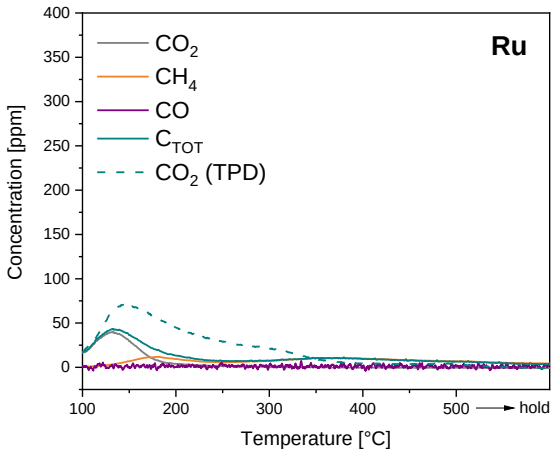

Fig. S2. Concentration profiles of CO_2, CH_4, CO and overall C profile (C_{TOT}) during H_2-TPSR tests on Ru/Al_2O_3 sample. The corresponding CO_2-TPD profiles (dashed lines) are reported for comparison. CO_2 pre-adsorption conditions: 1% CO_2/He while decreasing temperature from 500 to 100 ◦C (cooling rate: -5 ◦C/min). Heating to 500 ◦C at 10 ◦C/min in 4% H_2/He.

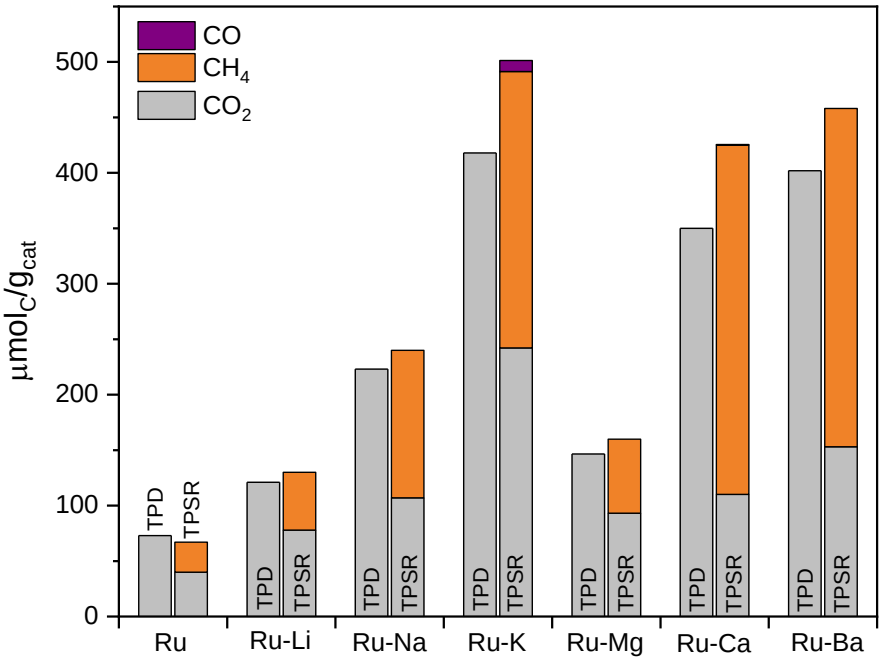

Fig. S3. Comparison of the amounts of the C-containing products during CO_2-TPD and H_2-TPSR tests

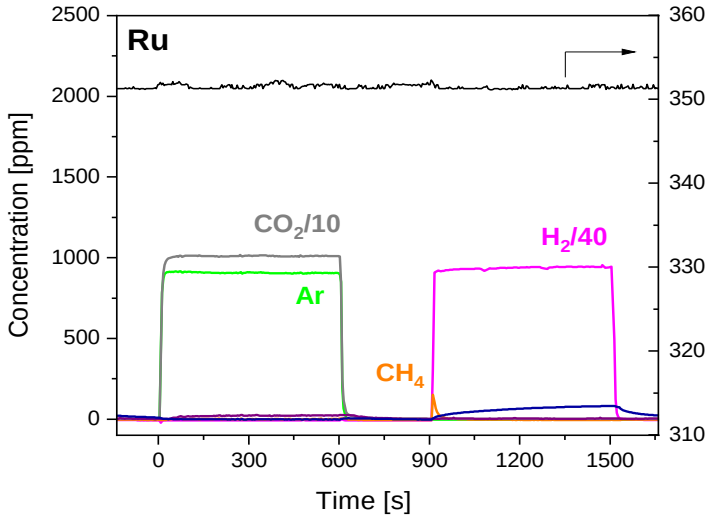

Fig. S4. CO_2 capture and methanation cycles at 350°C on the Ru/Al_2O_3 sample. Adsorption conditions: 1% CO_2/He; Reduction conditions: 4% H_2/He; Flowrate: 100 mL(STP)/min

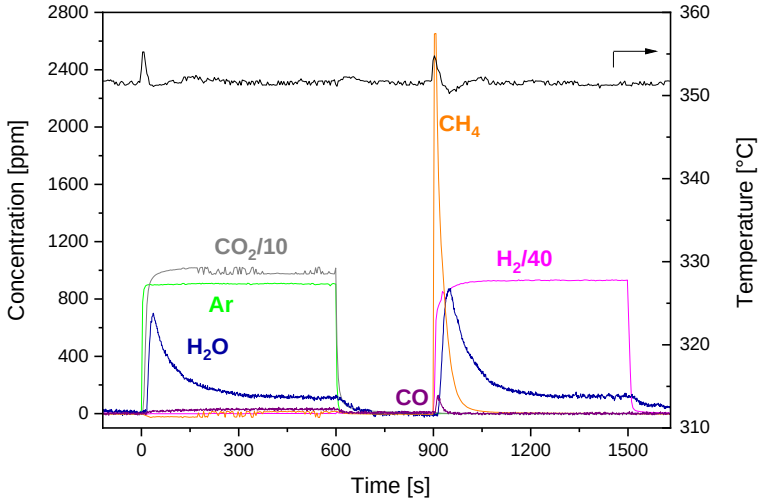

Fig. S5. CO_2 capture and methanation cycles at 350°C on a Ru-Na sample prepared starting from the carbonate precursor. Adsorption conditions: 1% CO_2/He; Reduction conditions: 4% H_2/He; Flowrate: 100 mL(STP)/min

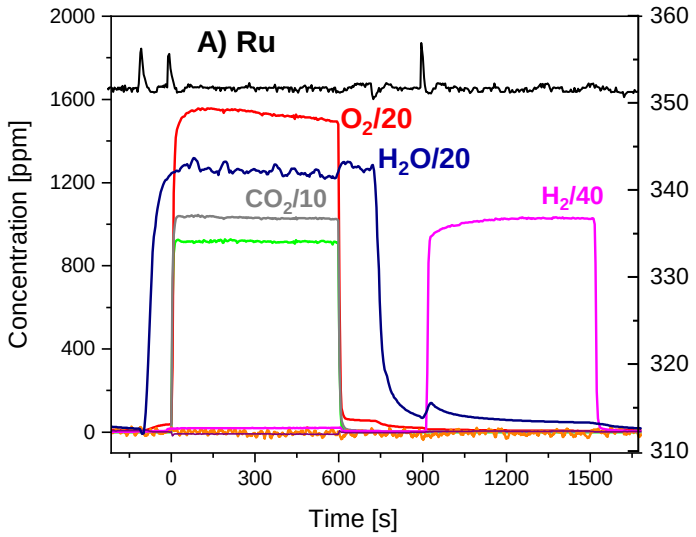

Fig. S6. CO_2 capture and methanation cycles at 350°C on the Ru/Al_2O_3 sample. Adsorption conditions: 2.5% H_2O/3% O_2/1% CO_2/He; Reduction conditions: 4% H_2/He; Flowrate: 100 mL(STP)/min

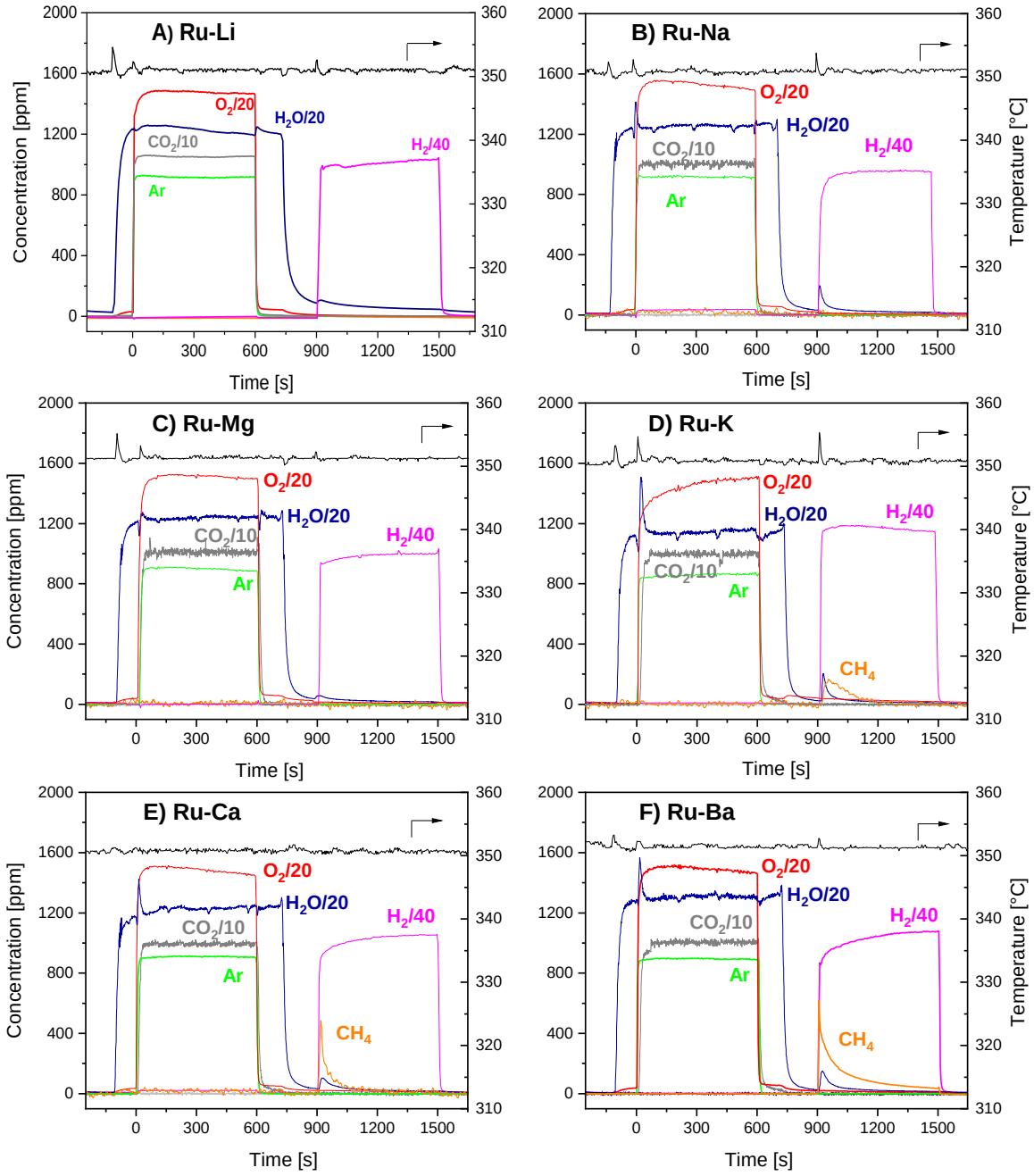

Fig. S7. CO_2 capture and methanation cycles at 350°C on Ru-Li (A), Ru-Na (B), Ru-Mg (C), Ru-K (D), Ru-Ca (E), Ru-Ba (F). Adsorption conditions: 2.5% H_2O/3% O_2/1% CO_2/He; Reduction conditions: 4% H_2/He; Flowrate: 100 mL(STP)/min

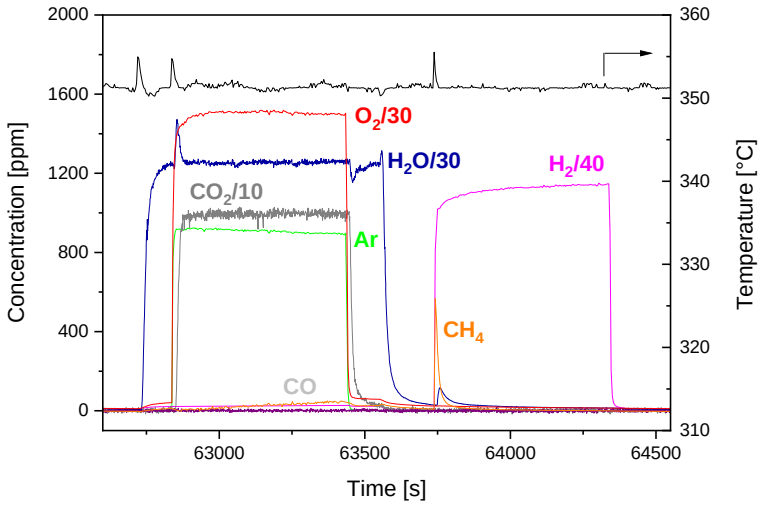

Fig. S8. CO_2 capture and methanation cycles at 350°C on a Ru-Na sample prepared starting from the carbonate precursor. Adsorption conditions: 2.5% H_2O/3% O_2/1% CO_2/He; Reduction conditions: 4% H_2/He; Flowrate: 100 mL(STP)/min