## **Supporting Information**

Fig. S1 showed coke deposition in reactor during furan cracking without molten salt. It could be observed that the coke deposition at 850 °C was more obvious than that at 750 °C. When temperature reached 850 °C, the process of furan to coke might be intensified, which caused the less production of gas.





(b)

Fig. S1. Pictures of coke deposition in reactor during furan cracking without molten salt. (a) 750 °C; (b) 850 °C.

Thermal stability experiment of molten salt was carried out as shown in Table S1. A certain amount of prepared molten salt was weighed and placed in a crucible which is burned to constant weight at 900 °C in advance, and the initial mass of molten salt was recorded. The crucible was heated at 600, 700, 800 and 900 °C for 24 h, and then the mass was recorded. Compared with the initial mass, the mass loss rate of molten salt at different temperatures was obtained, which reflected the thermal stability of molten salt. It could be found that the yield of molten salt decomposing was very small even at 900 °C. In our present study, the heating time of molten salt was 1 h, much shorter than that in previous thermal stability experiment. Therefore, such a few yield of molten salt decomposing could hardly have significant effect on the results.

Table S1. Mass loss rate of molten salt at different temperatures.

Temperature	Mass loss rate (%)			Average mass
(°C)	Group 1	Group 2	Group 3	loss rate (%)

600	0.36	0.27	0.33	0.32
700	0.41	0.40	0.42	0.41
800	1.17	1.02	1.90	1.36
900	4.01	3.12	4.10	3.74

In furan CO<sub>2</sub>-reforming, the mass balance of  $CO_2$  supply was calculated as Table S2 shown. Table S2.  $CO_2$  balance during furan reforming at different conditions.

Condition	CO <sub>2</sub> balance (mmol/10 <sup>-2</sup> mol C <sub>4</sub> H <sub>4</sub> O)			
Condition	CO <sub>2</sub> supplied	CO <sub>2</sub> collected	CO <sub>2</sub> consumed	
650 °C NS	128.91	126.16	2.75	
750 °C NS	128.91	124.31	4.60	
850 °C NS	128.91	124.52	4.39	
650 °C MS	128.91	128.63	0.28	
750 °C MS	128.91	127.34	1.57	
850 °C MS	128.91	118.08	10.83	