

Table S1 Change in the inlet pressure with reaction temperature

Sample name	Temperature (°C)			
	300	400	500	600
16Co63C21Al	0	0.05	0.69	0.39
16Co42C21Ce21Al	0	0	0.32	0.15
16Co63C21Zr	0	0	0.80	1.86
16Co42C10.5Ce31.5Zr	0.03	0.08	1.18	0.68
16Co42C21Ce21Zr	0	0	0.07	0.14
16Co42C31.5Ce10.5Zr	0	0	1.90	0.42

Values are expressed by the scale of MPa on a gauge.

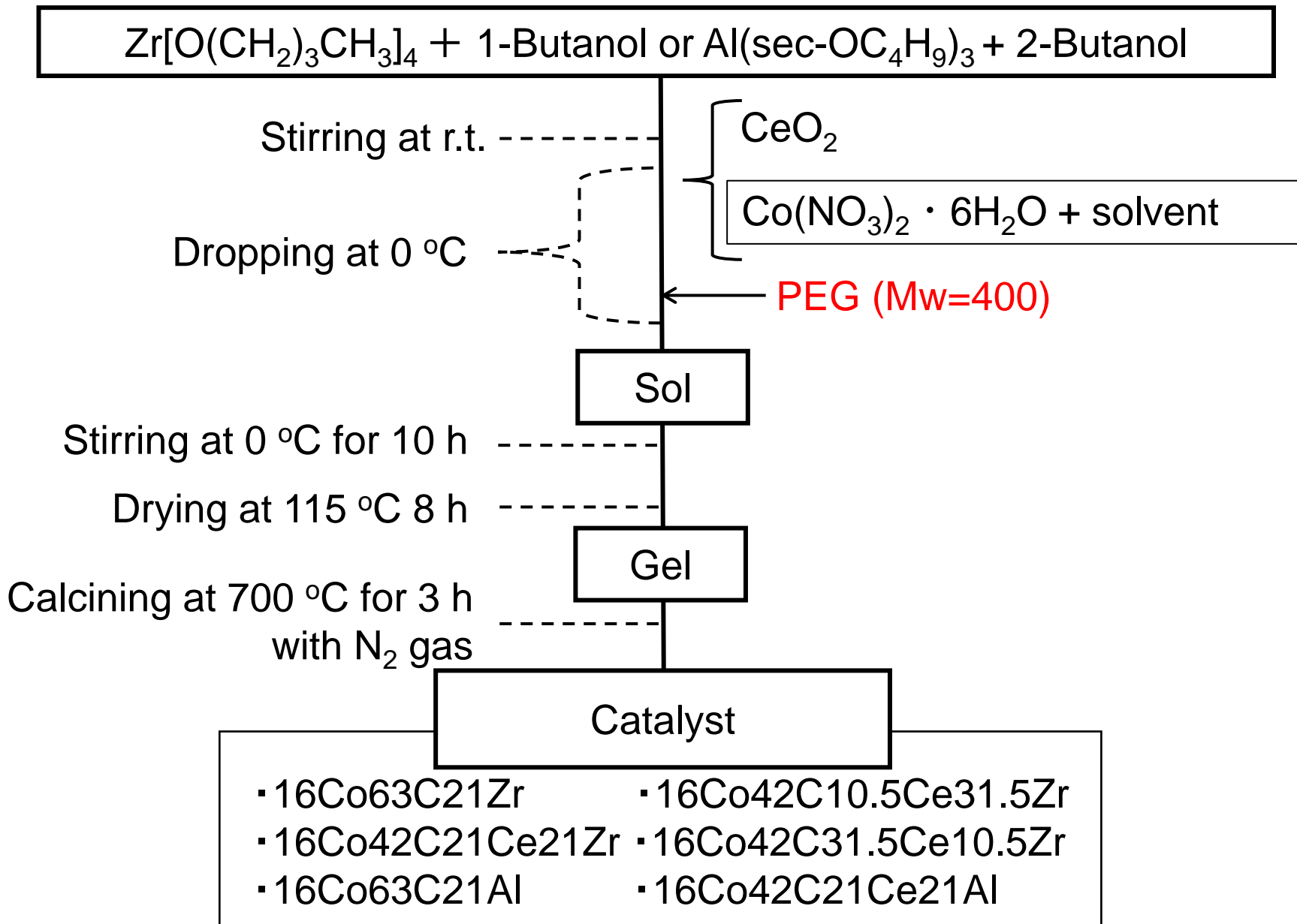


Fig. S1 Flowchart for preparation of catalysts using the sol-gel method.

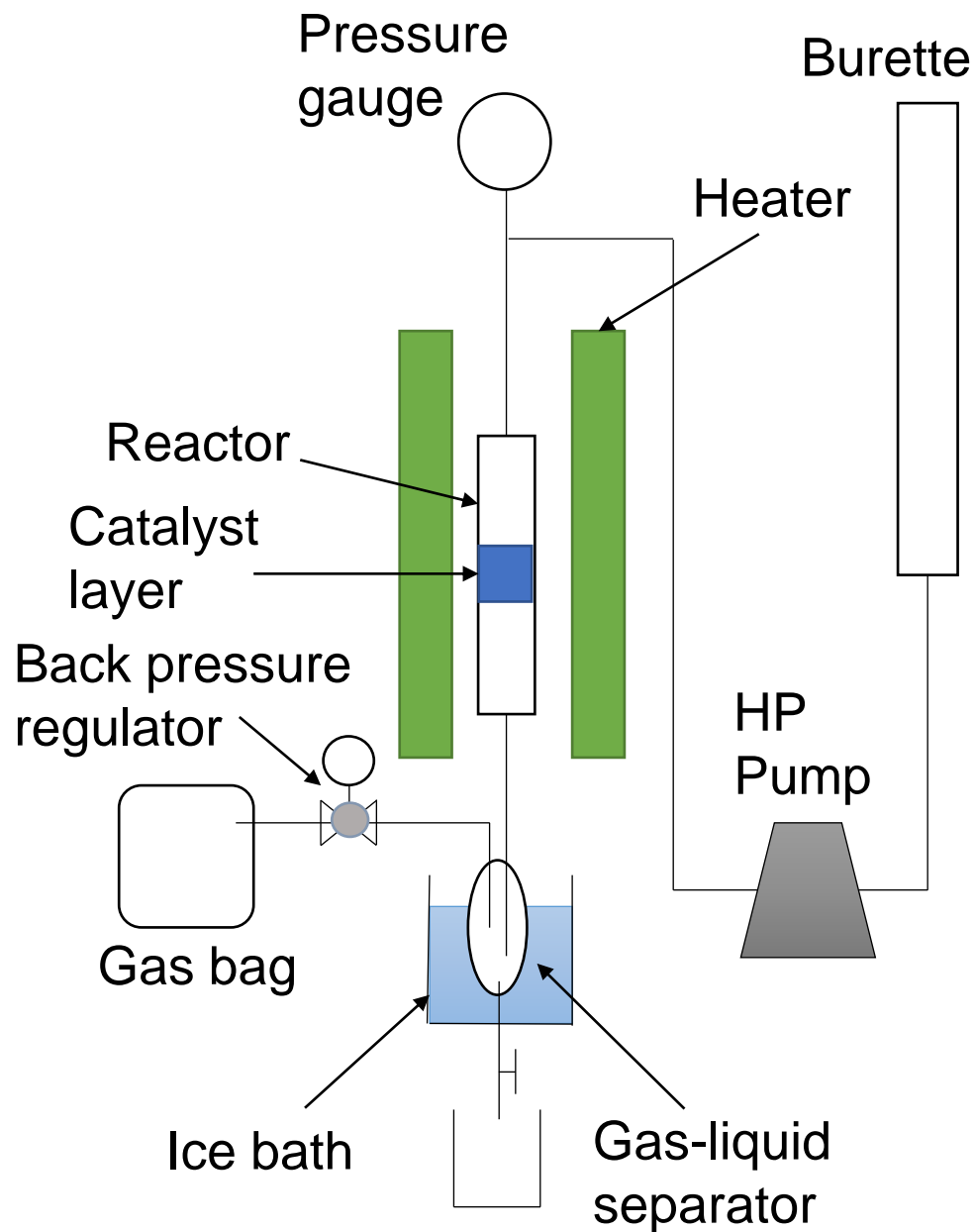


Fig. S2 Reaction apparatus of steam reforming of ethanol.

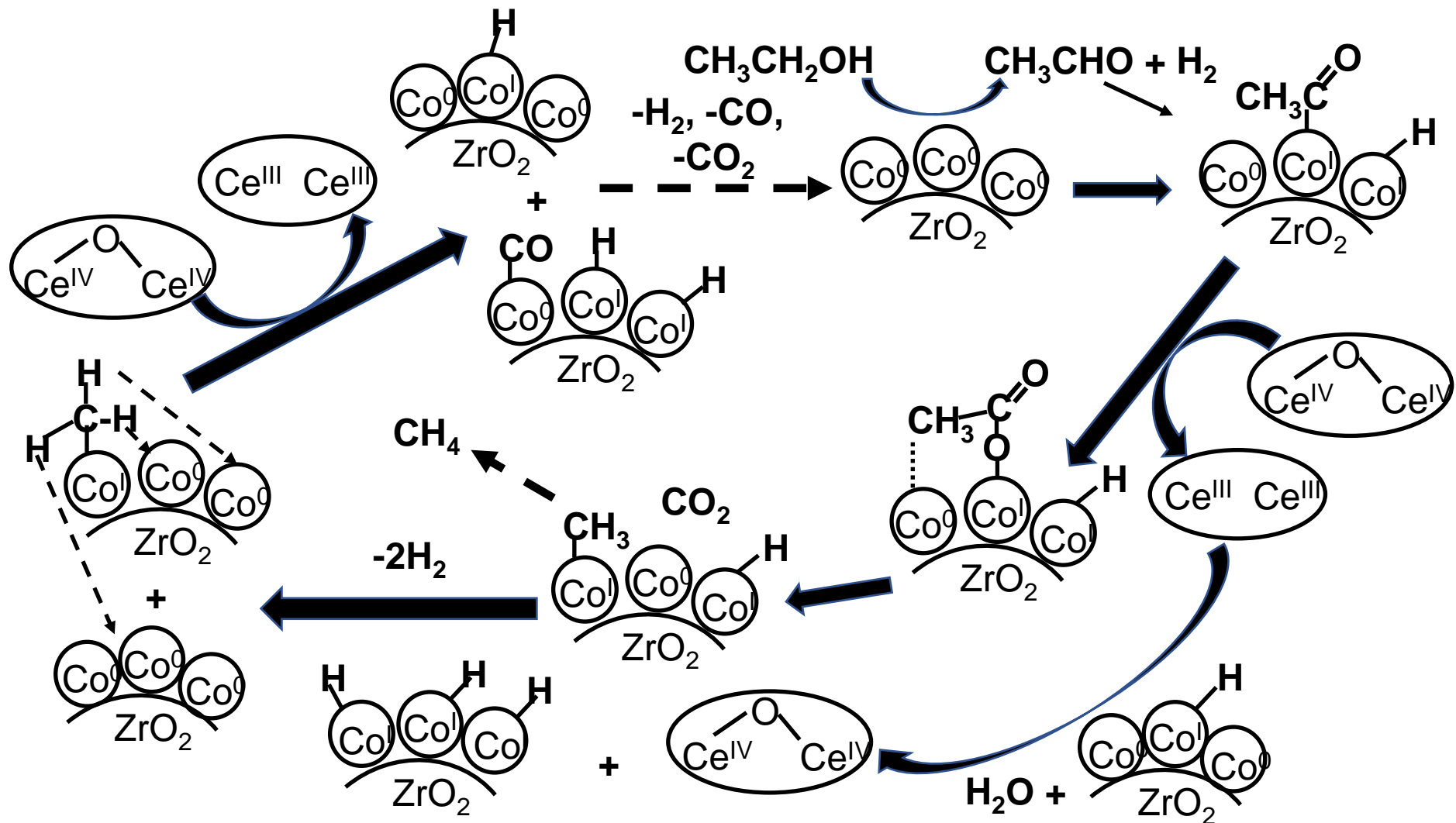


Figure S3 Another possible reaction routes in steam reforming of ethanol catalyzed by Co/CeO<sub>2</sub>-ZrO<sub>2</sub>