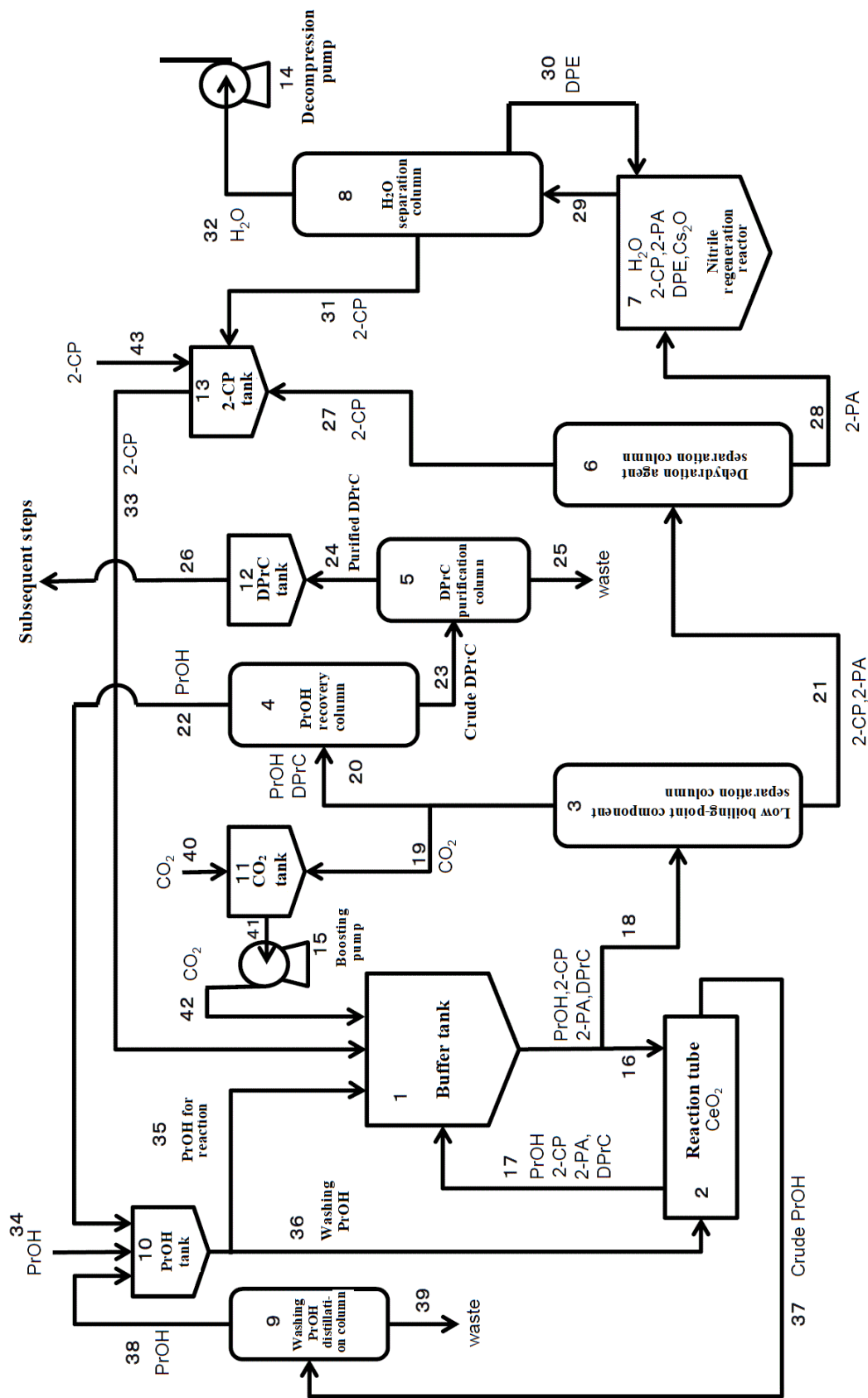
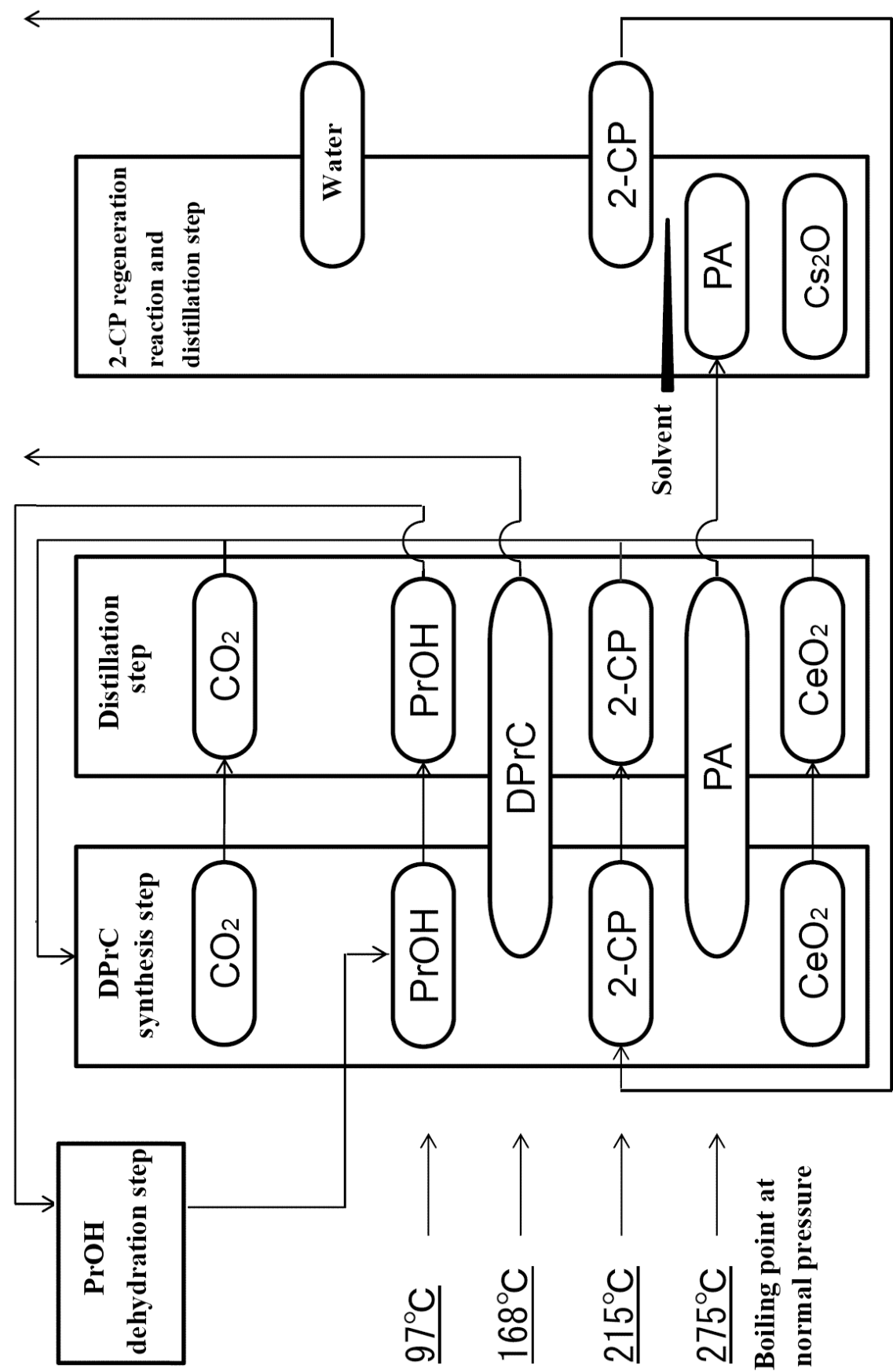


FIG. 1



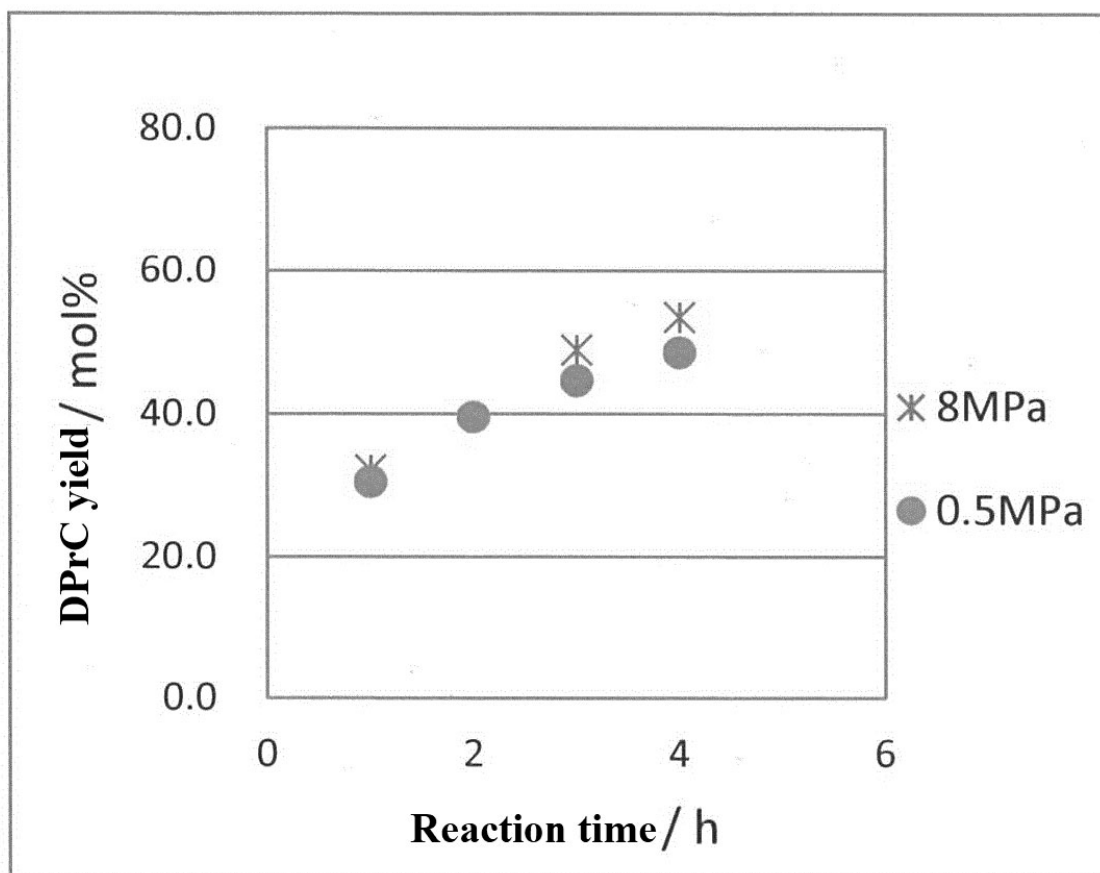
G1912SG

FIG. 2



G1912SG

FIG. 3

**Reaction conditions**

CeO₂ : 2.8mmol, 2-CP : 140 mmol, 1-PrOH : 280mmol

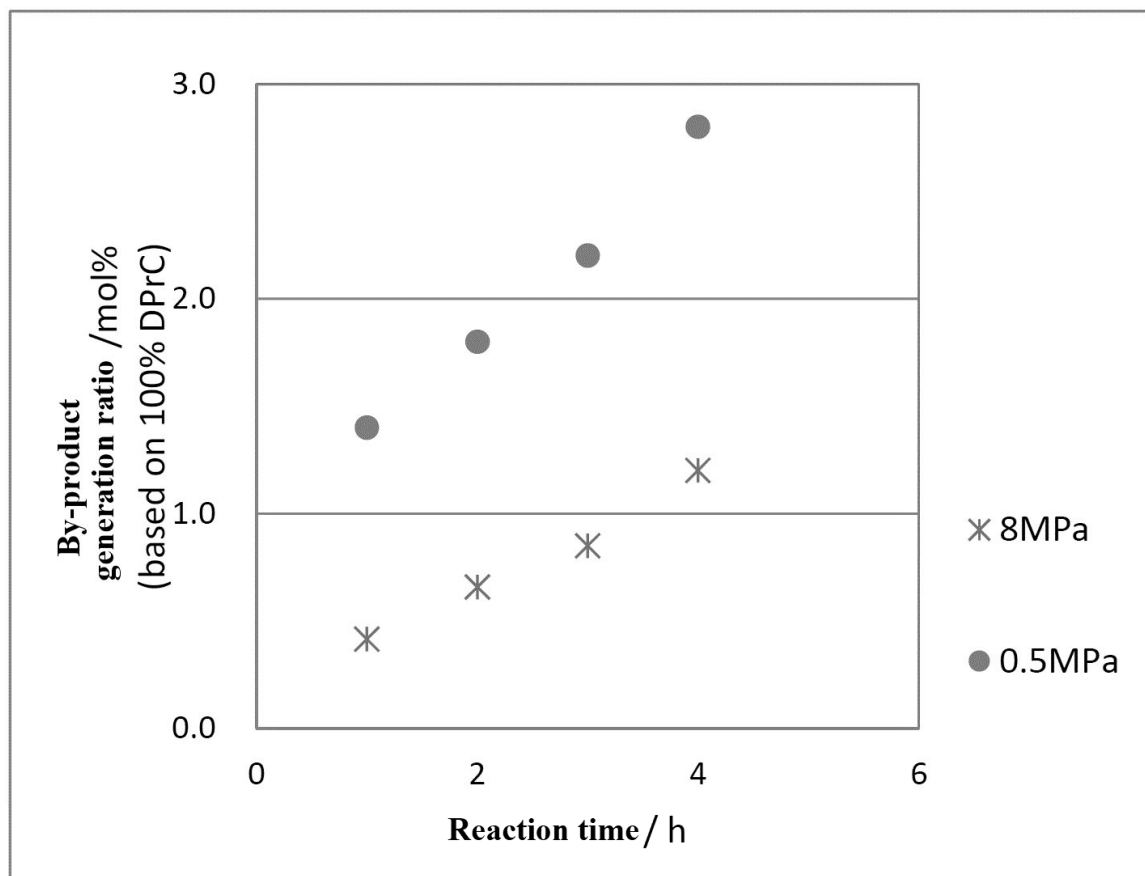
Reaction Pressure : 8 MPa,

Reaction temperature : 132°C,

Reaction time : 1~4h

G1912SG

FIG. 4

**Reaction conditions**

CeO₂ : 2.8mmol, 2-CP : 140 mmol, 1-PrOH : 280mmol

Reaction Pressure : 8 MPa,

Reaction temperature : 132°C,

Reaction time : 1~4h

G1912SG

FIG. 5

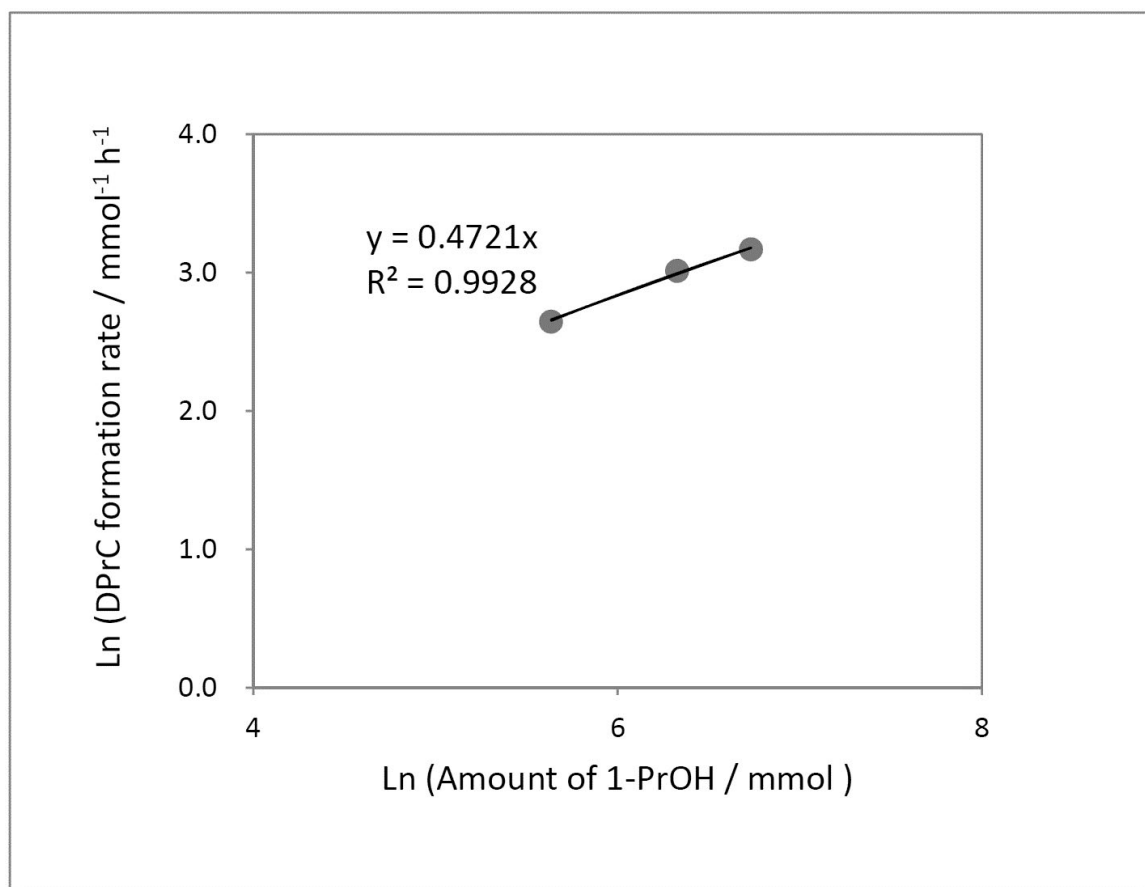
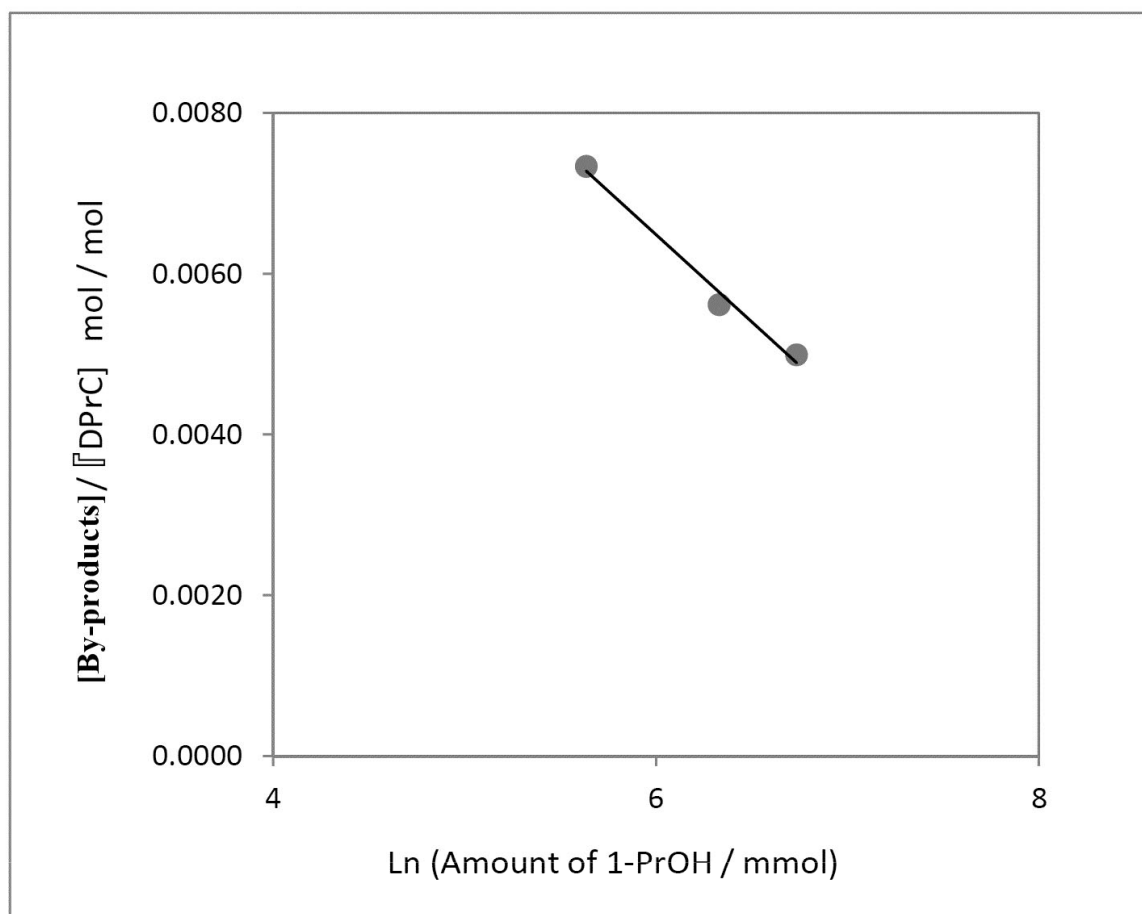
**Reaction conditions****CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 280~840mmol****Reaction Pressure : 8 MPa,****Reaction temperature : 132°C,****Reaction time : 4h**

FIG. 6

**Reaction conditions**

CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 280~840mmol

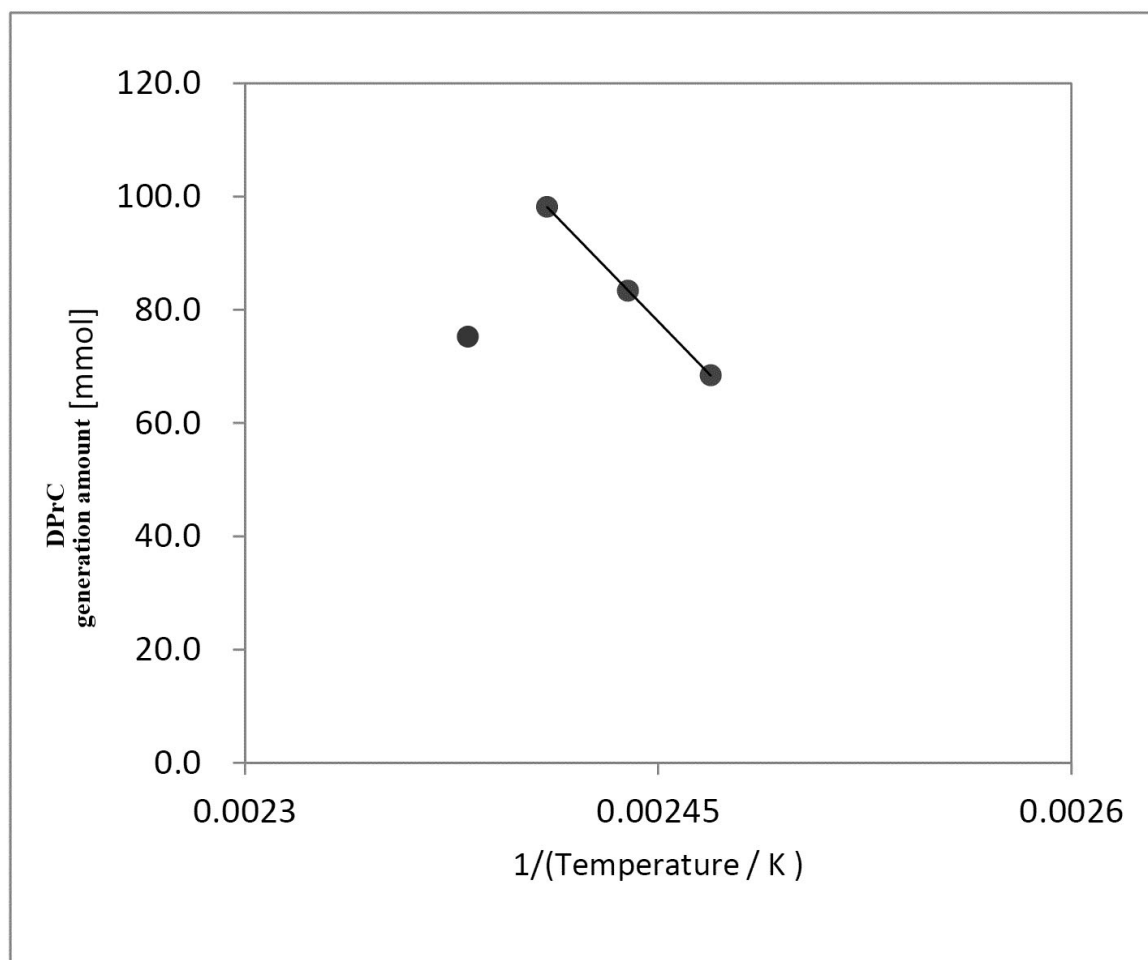
Reaction Pressure : 8 MPa,

Reaction temperature : 132°C,

Reaction time : 4h

G1912SG

FIG. 7

**Reaction conditions**

CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 840mmol

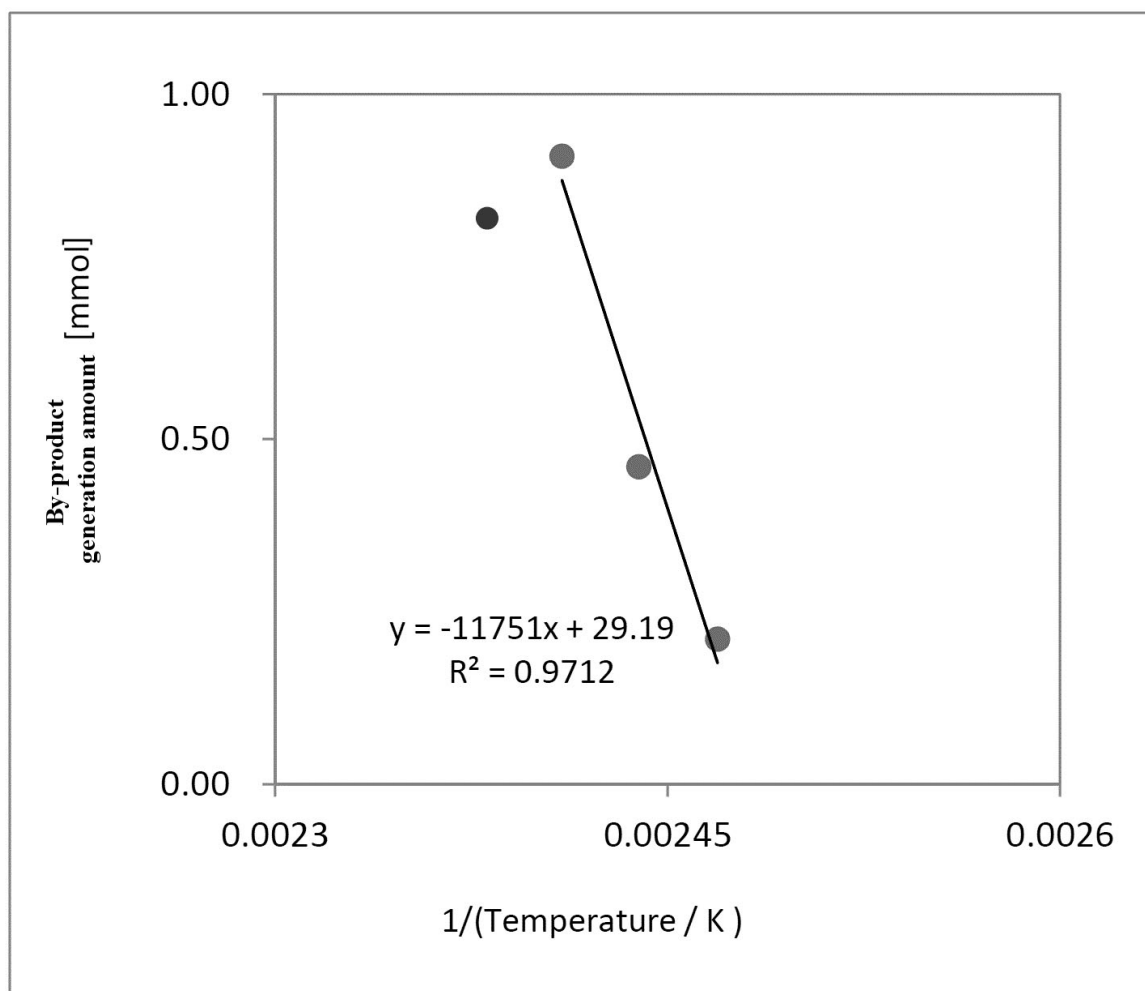
Reaction Pressure : 8 MPa,

Reaction temperature : 132~147°C,

Reaction time : 2h

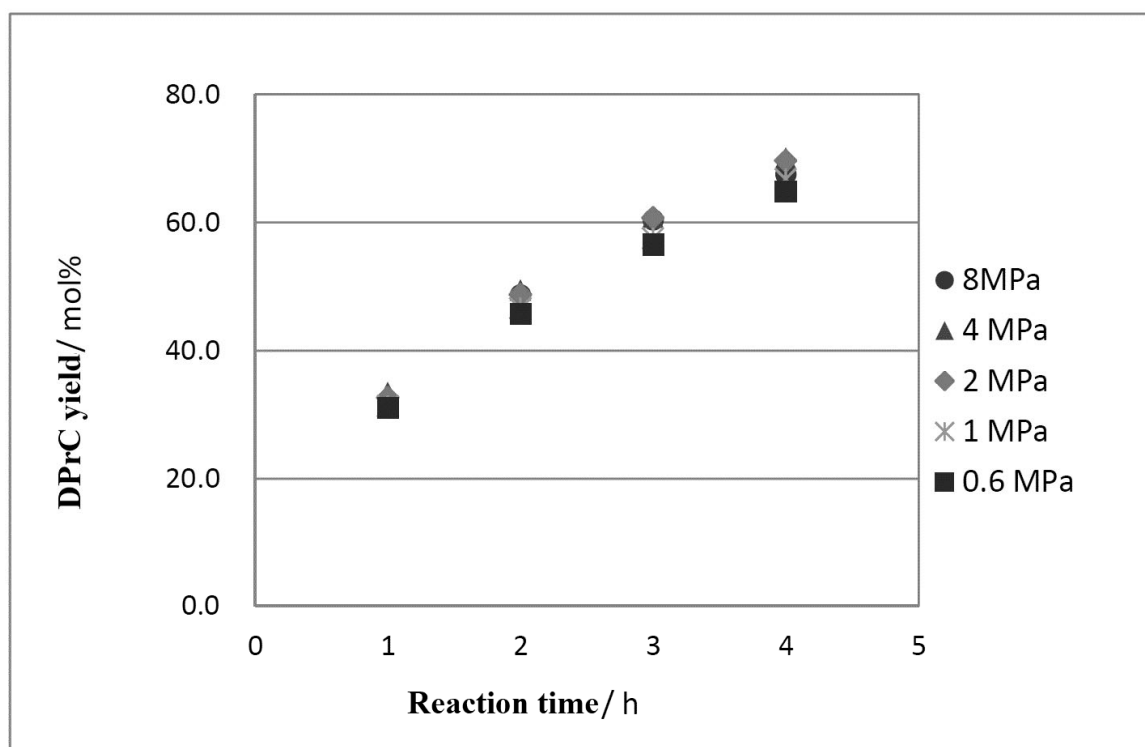
G1912SG

FIG. 8

**Reaction conditions****CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 840mmol****Reaction Pressure : 8 MPa,****Reaction temperature : 132~147°C,****Reaction time : 2h**

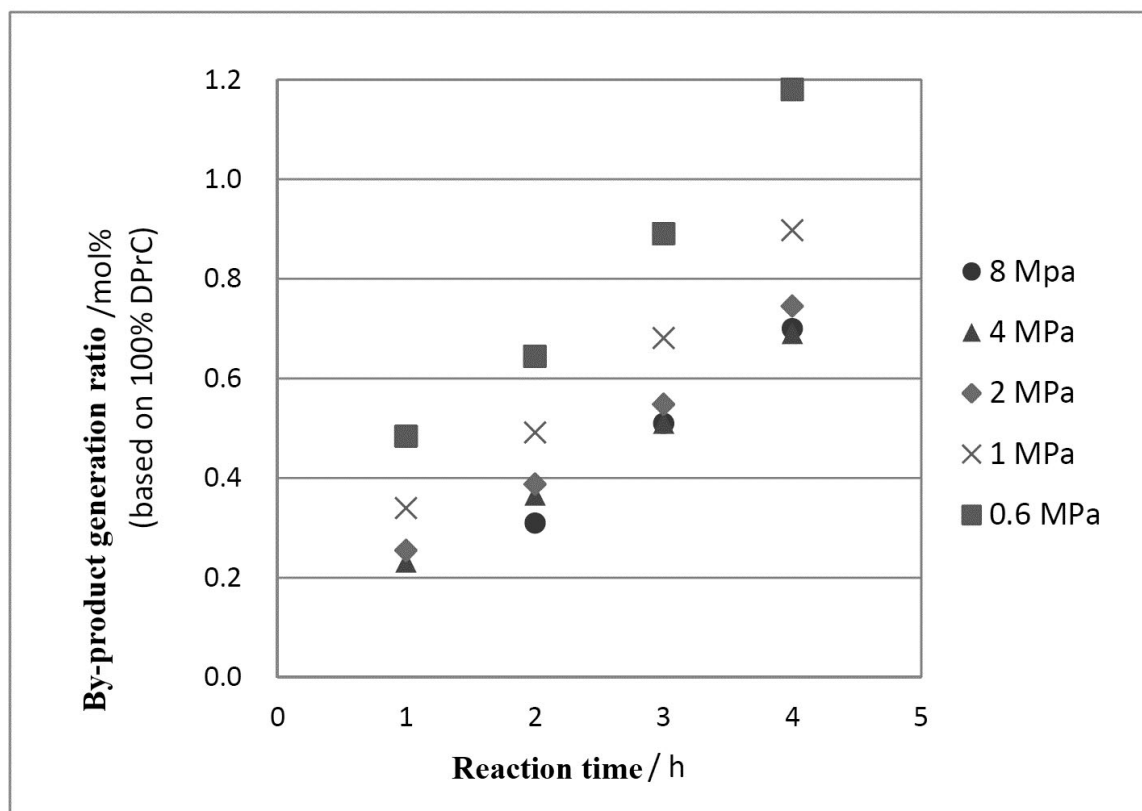
G1912SG

FIG. 9

**Reaction conditions****CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 840mmol****Reaction Pressure : 0.6~8 MPa,****Reaction temperature : 132°C,****Reaction time : 1~4h**

G1912SG

FIG. 10



Reaction conditions

CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 840mmol

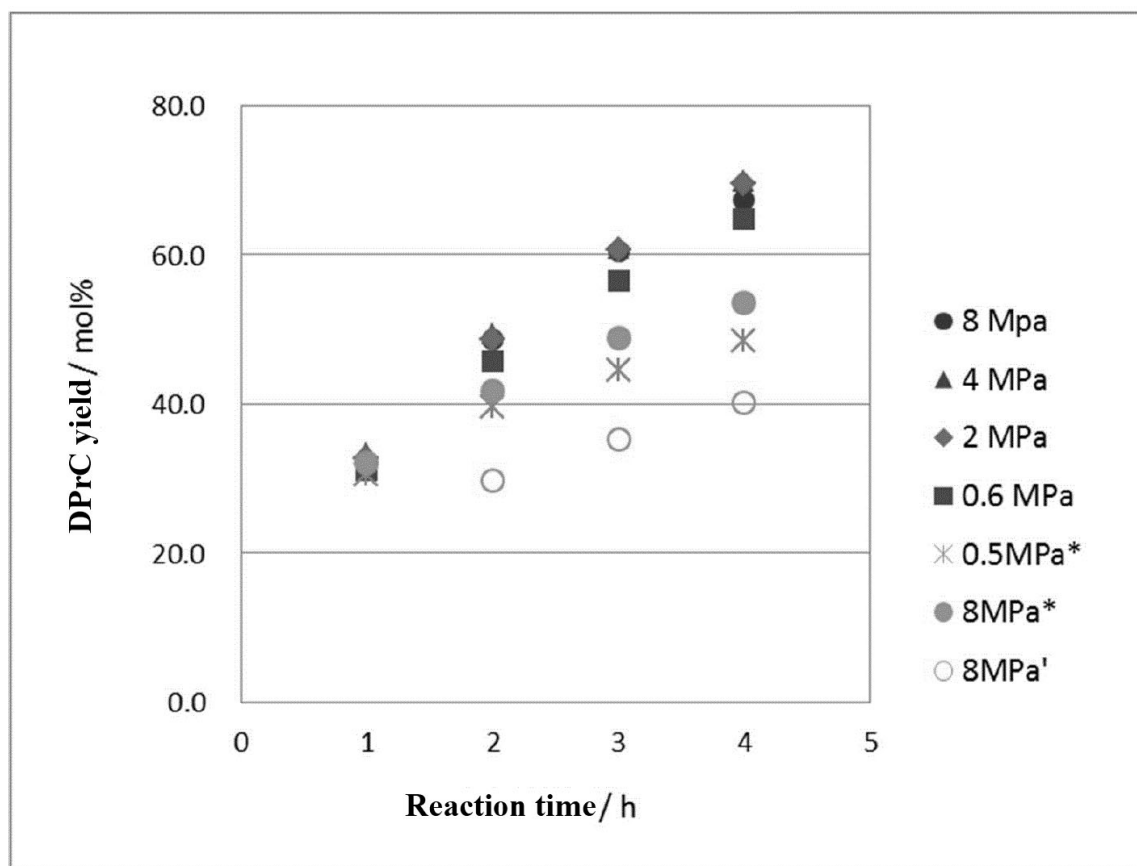
Reaction Pressure : 0.6~8 MPa,

Reaction temperature : 132°C,

Reaction time : 1~4h

G1912SG

FIG. 11



Reaction conditions

Reaction time : 1~4h, Reaction temperature : 132°C,

1) Reaction Pressure : 0.6~8 MPa

CeO₂: 1.4mmol, 2-CP: 140 mmol, 1-PrOH: 840mmol

2) Reaction Pressure : 0.5MPa* and 8MPa*

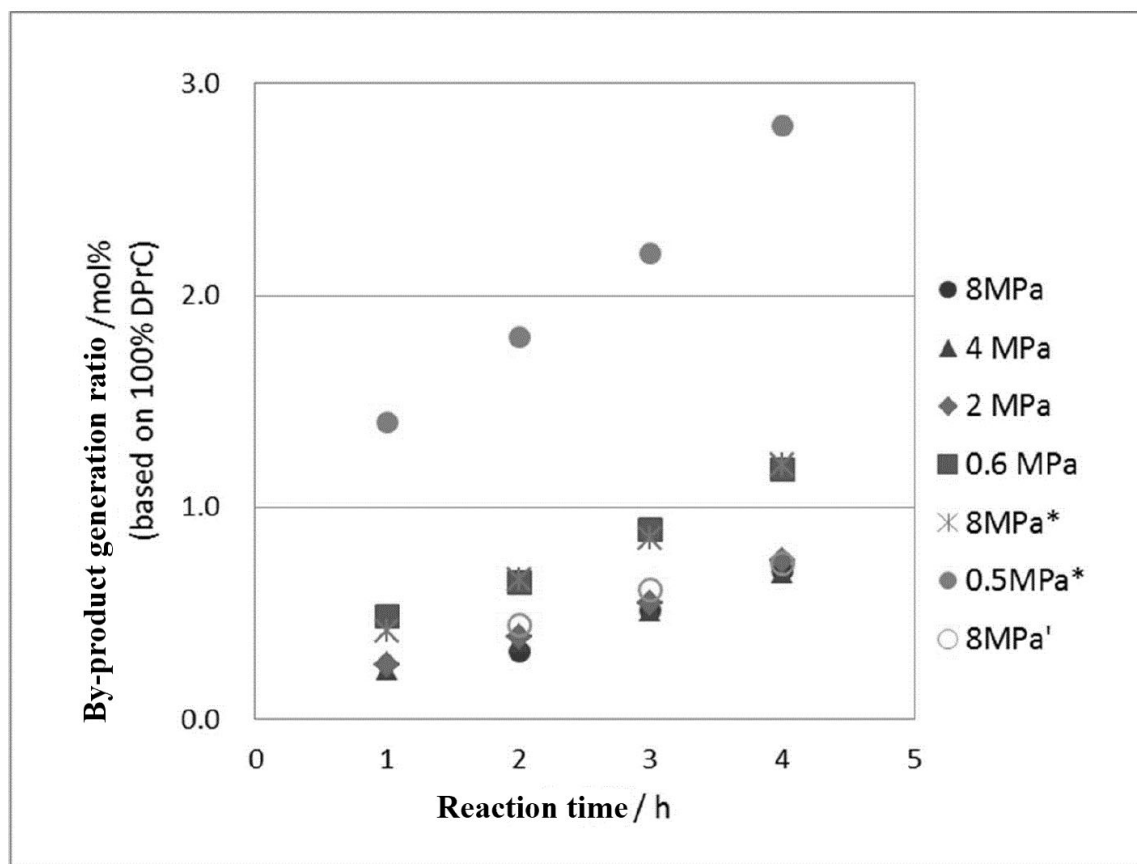
CeO₂: 2.8mmol, 2-CP: 140 mmol, 1-PrOH: 280mmol

3) Reaction Pressure : 8MPa'

CeO₂: 1.4mmol, 2-CP: 140 mmol, 1-PrOH: 280mmol

G1912SG

FIG. 12



Reaction conditions

Reaction time : 1~4h, Reaction temperature : 132°C,

1)Reaction Pressure : 0.6~8 MPa

CeO₂:1.4mmol, 2-CP:140 mmol, 1-PrOH:840mmol

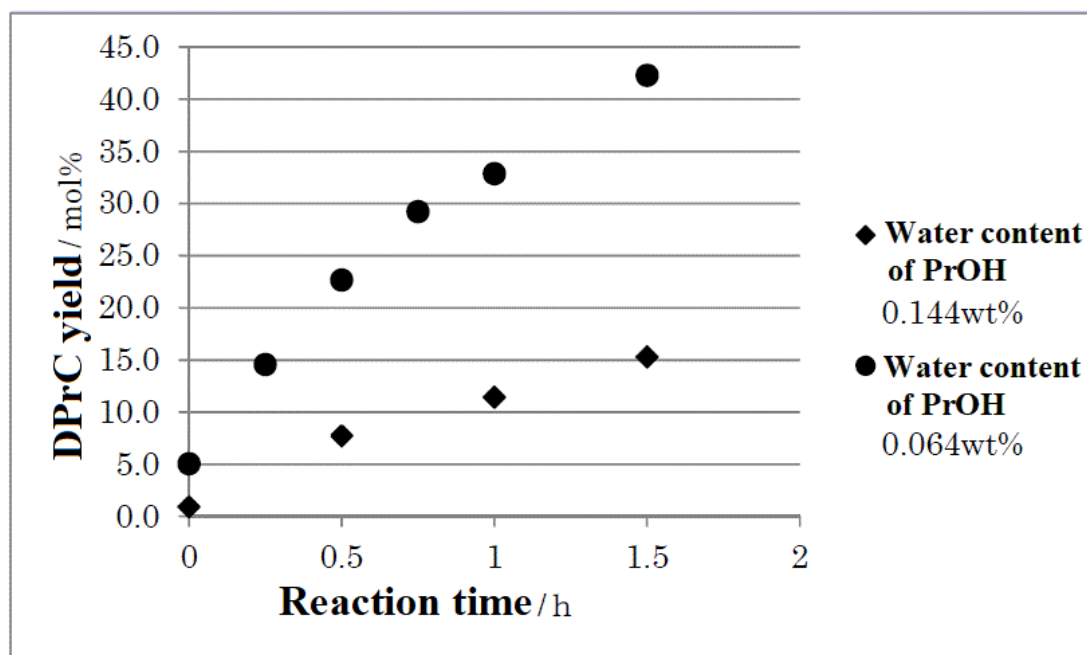
2)Reaction Pressure : 0.5MPa* and 8MPa*

CeO₂:2.8mmol, 2-CP:140 mmol, 1-PrOH:280mmol

3)Reaction Pressure : 8MPa'

CeO₂:1.4mmol, 2-CP:140 mmol, 1-PrOH:280mmol

FIG. 13



Reaction conditions

CeO₂ : 1.4mmol, 2-CP : 140 mmol, 1-PrOH : 840mmol

Reaction Pressure : 8 MPa,

Reaction temperature : 132°C,

Reaction time : 0~1.5h