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Fig. 1

Toluene Methylation over Catalyst A

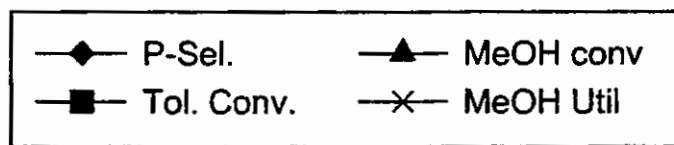
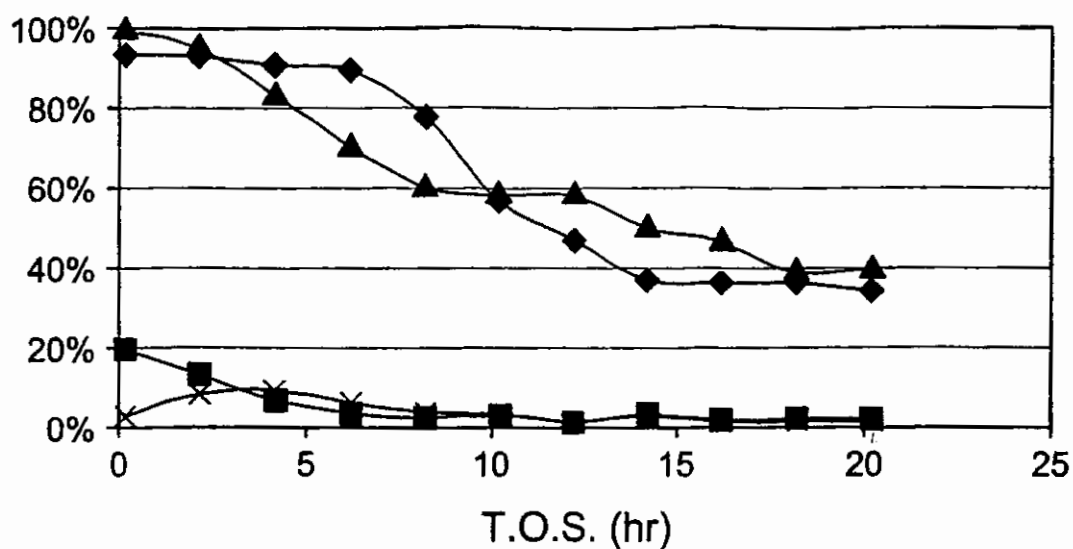
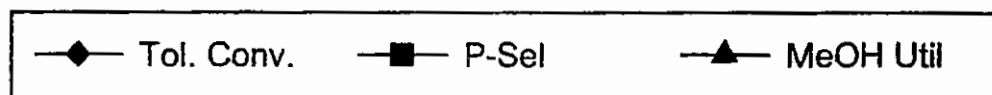
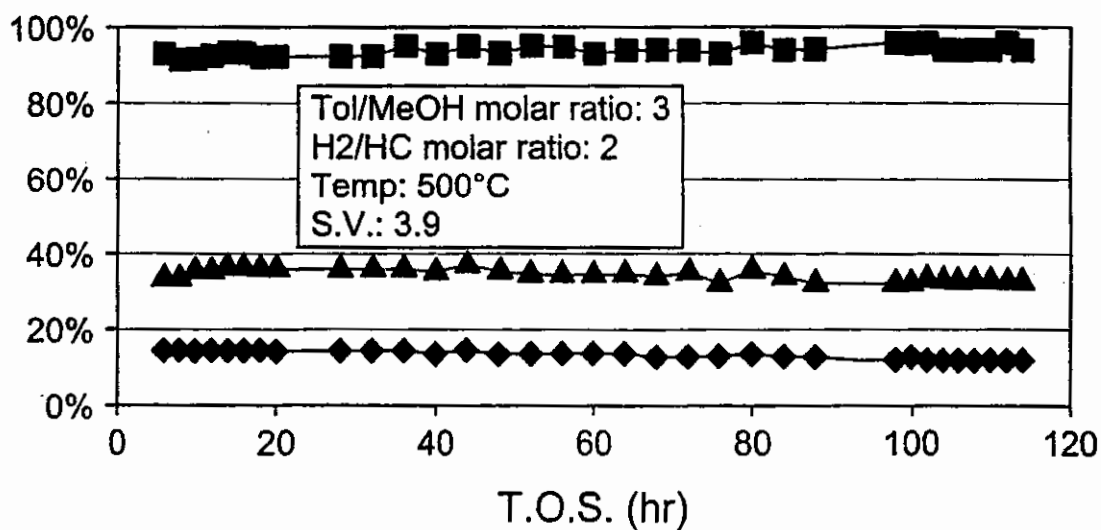


Fig. 2

Toluene Methylation over Catalyst B



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Fig. 3

Toluene Conversion over Catalysts C, D, and E

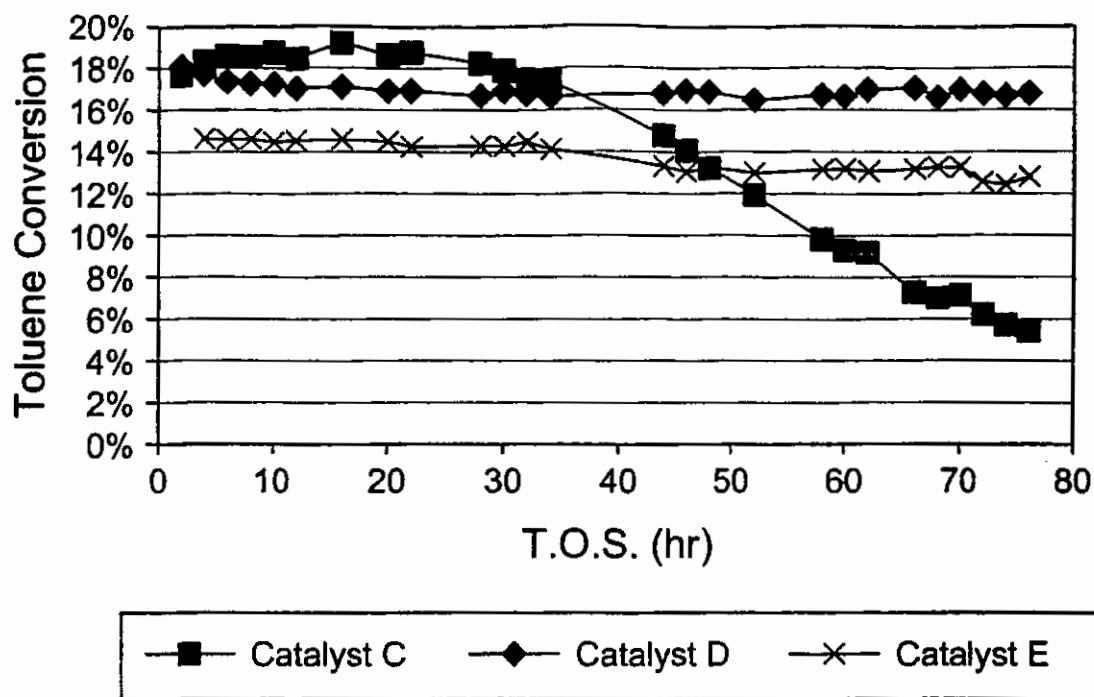
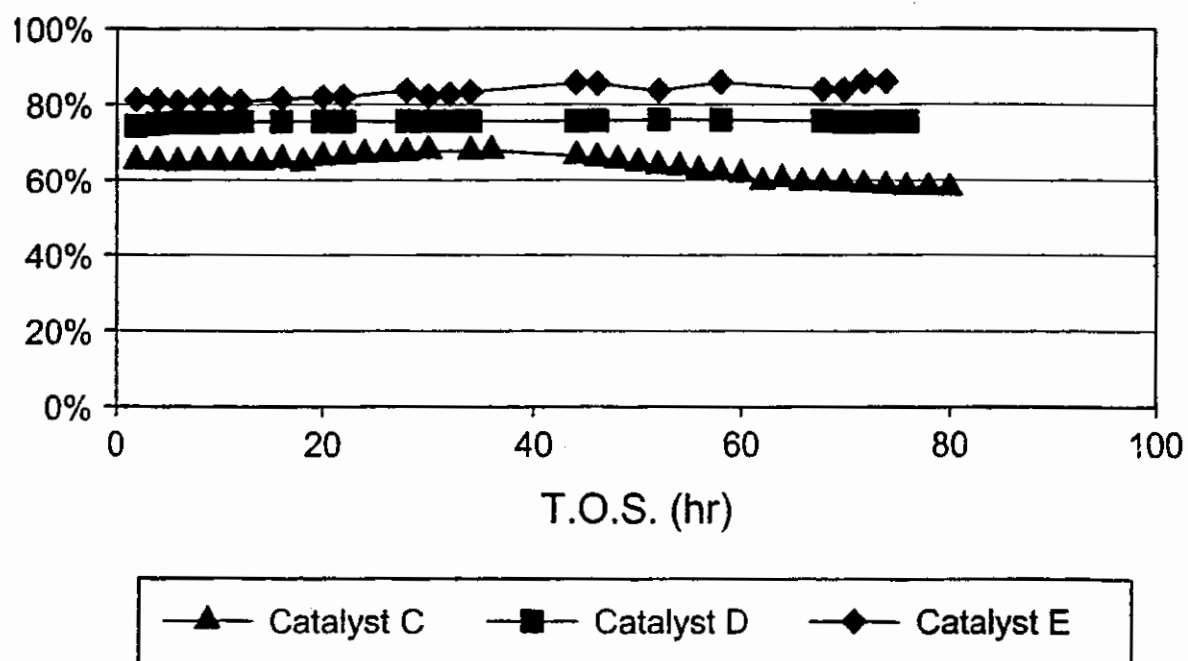


Fig. 4

P-Xylene Selectivity over Catalysts C, D, and E



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Fig. 5

Methanol Utilization over Catalysts C, D, and E

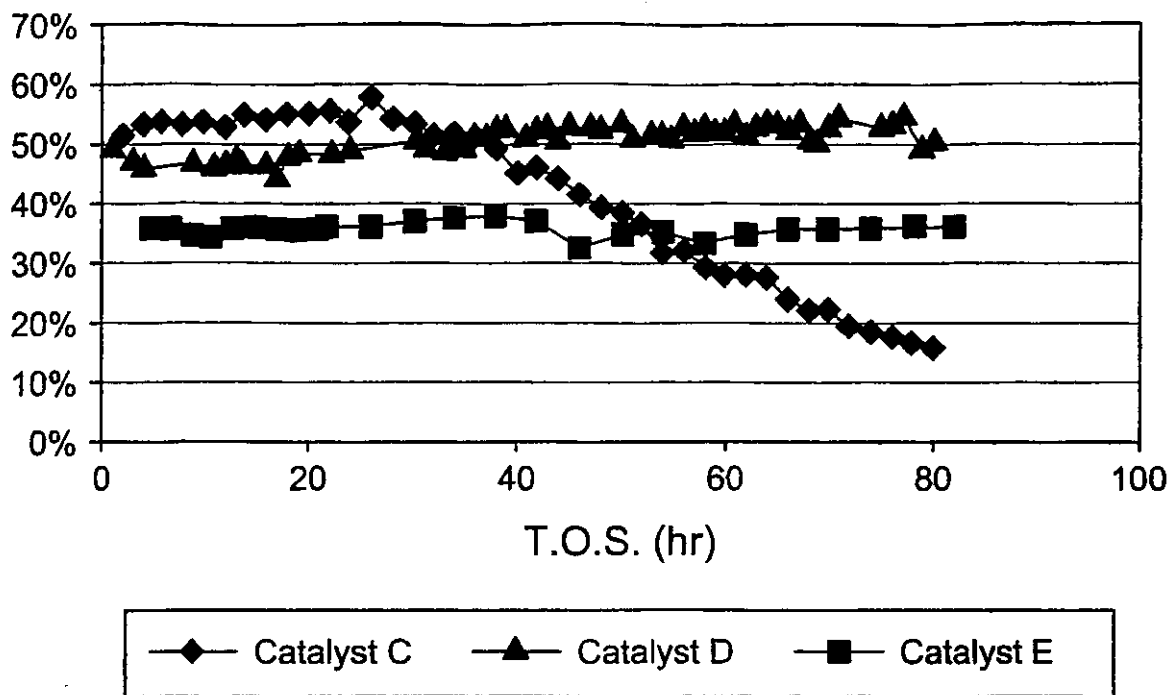
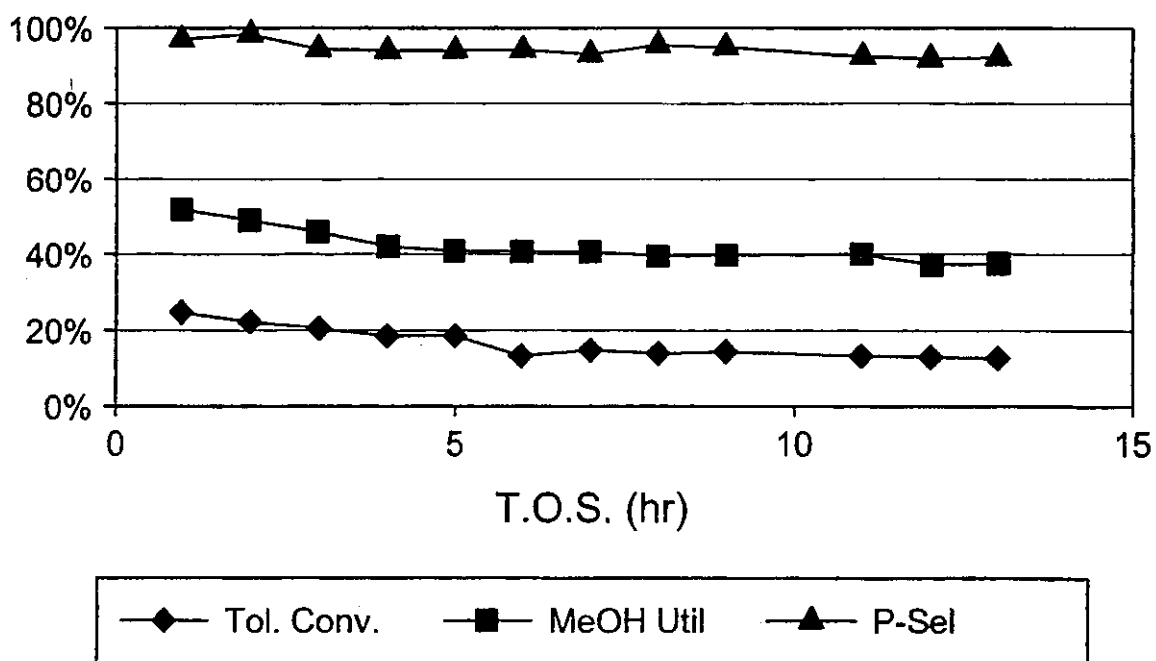


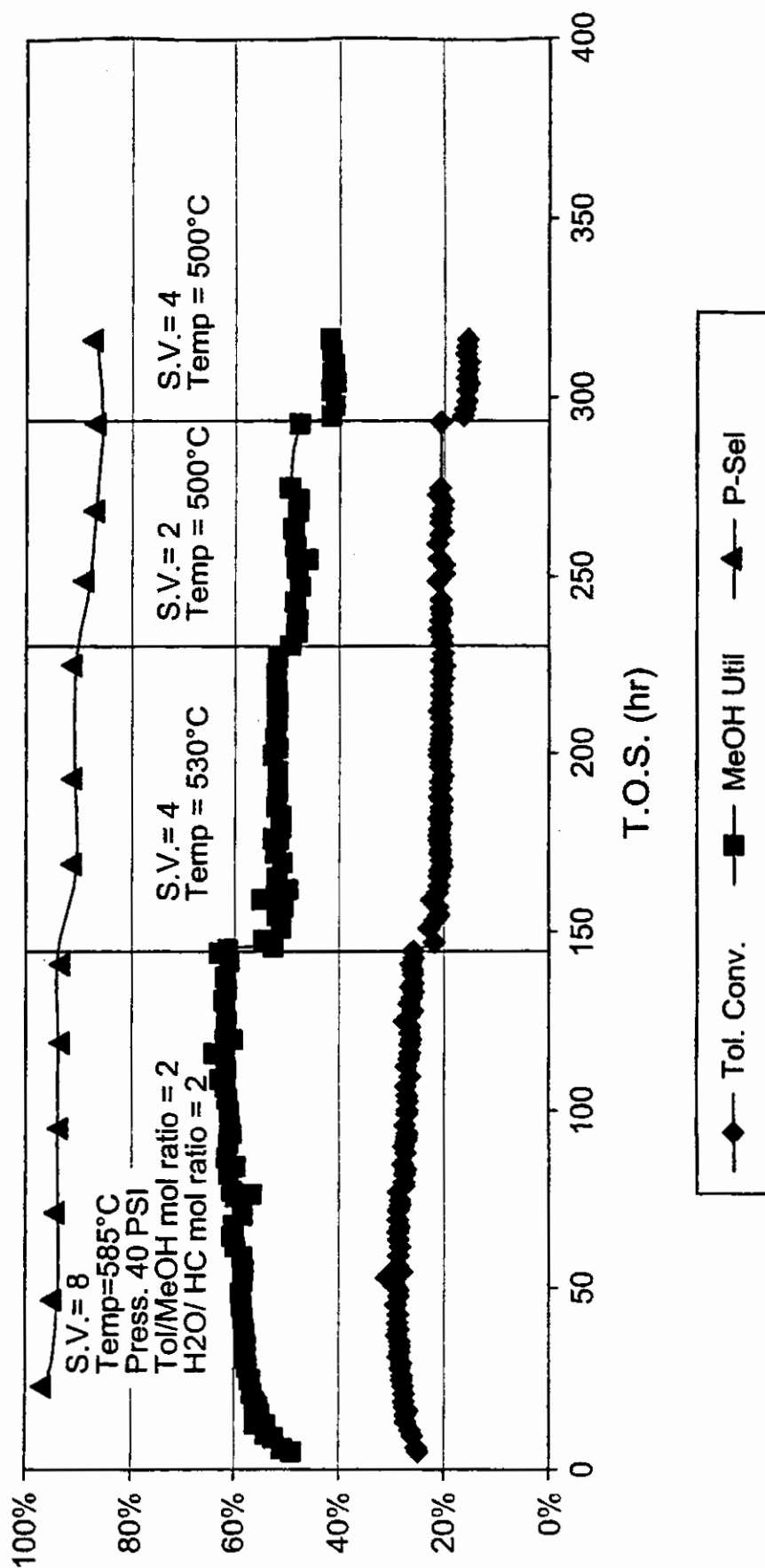
Fig. 6

Toluene Methylation over Catalyst F



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Fig. 7
Toluene Methylation over Catalyst G



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Fig. 8

Toluene Methylation over Catalyst H

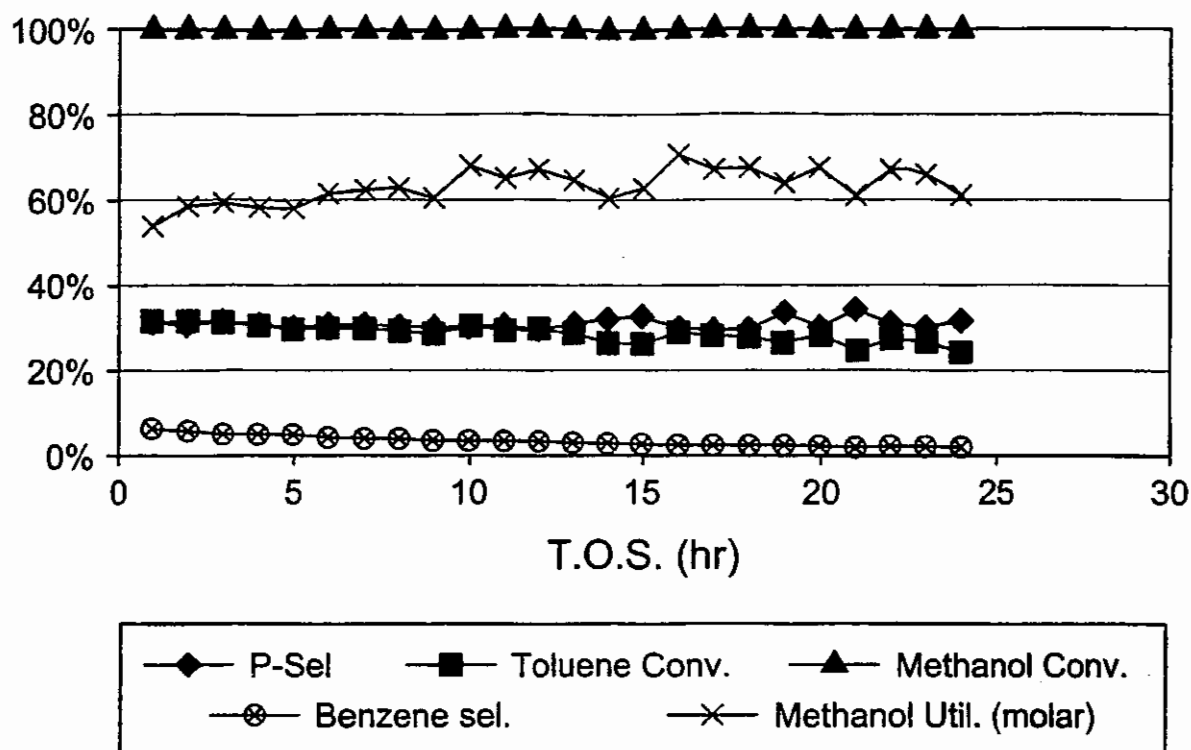
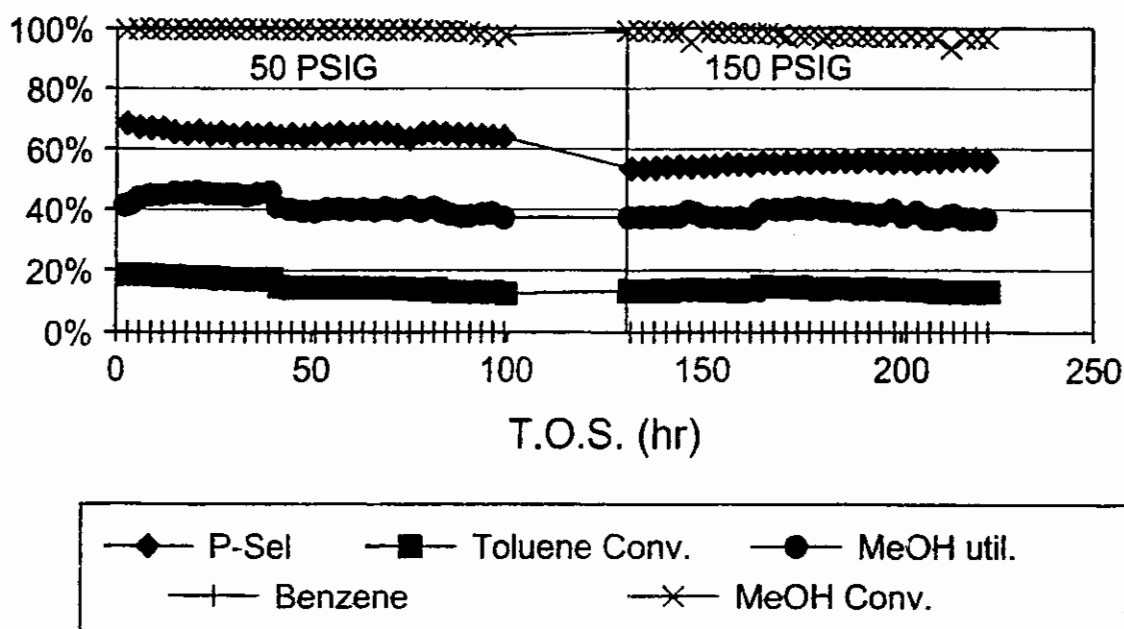
Tol/MeOH 3:1, H₂/HC 0.8:1, S.V. 3.9, Press 15 PSIG, Temp 500°C

Fig. 9

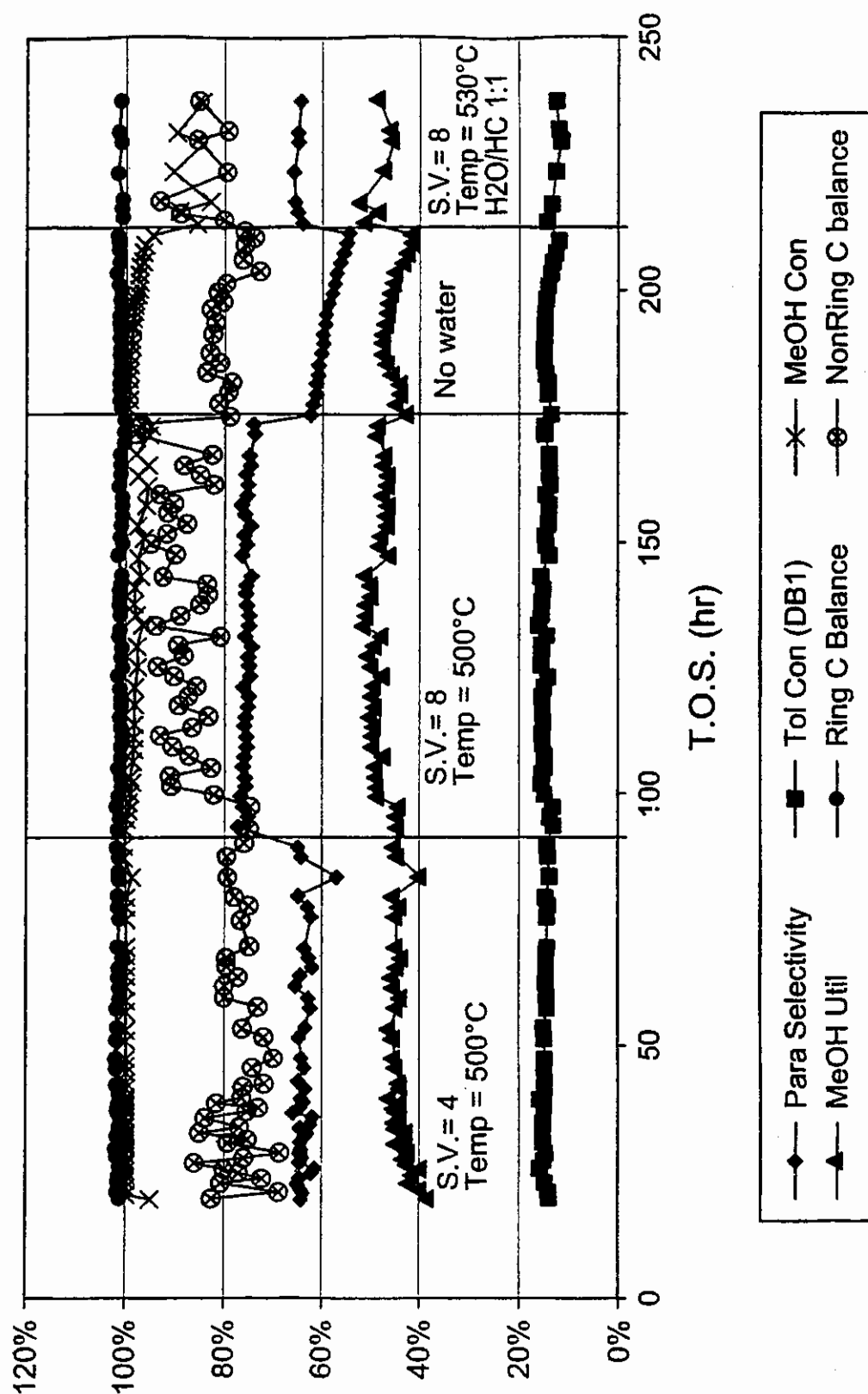
Toluene Methylation over Catalyst I

Tol/MeOH mol ratio=3, H₂/HC=2, S.V. 4, temp 500°C

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Fig. 10

Toluene Methylation over Catalyst J

Tol/MeOH mol ratio 3, H₂/HC 2, HC/H₂O mol ratio 1:1

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Fig. 11

Toluene Methylation over Catalyst K

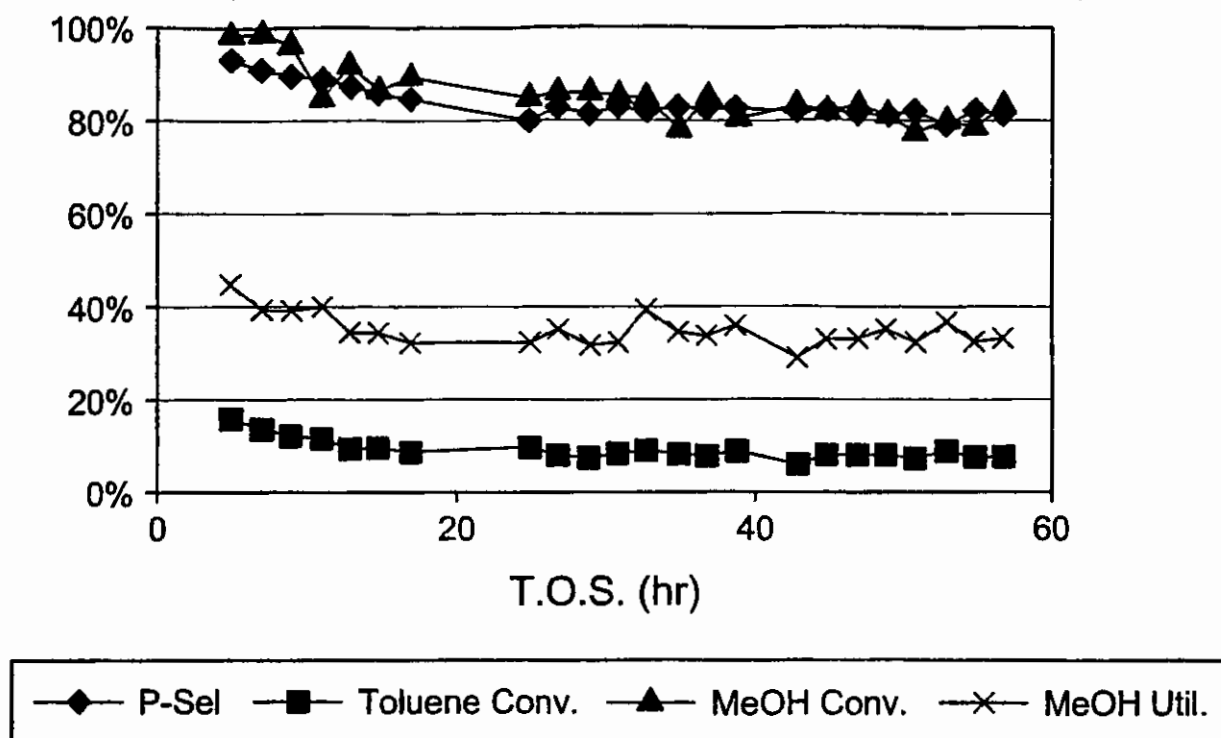
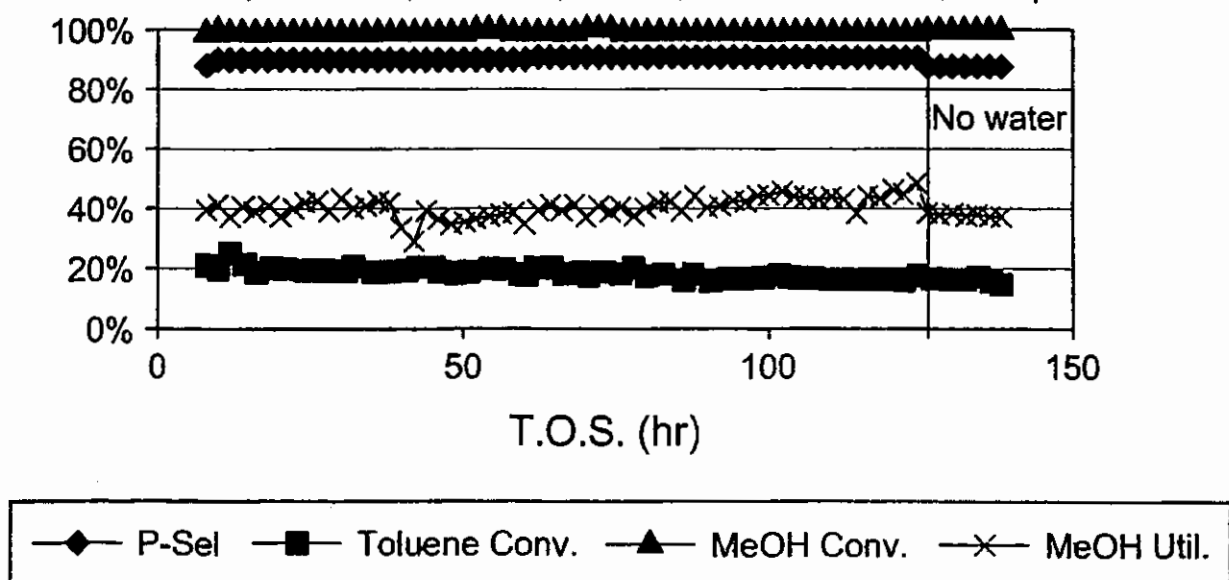
Tol:MeOH 3:1, H₂/HC 1:1, H₂HC 1:1, S.V. 8, Press 50 PSIG, Temp 500°C

Fig. 12

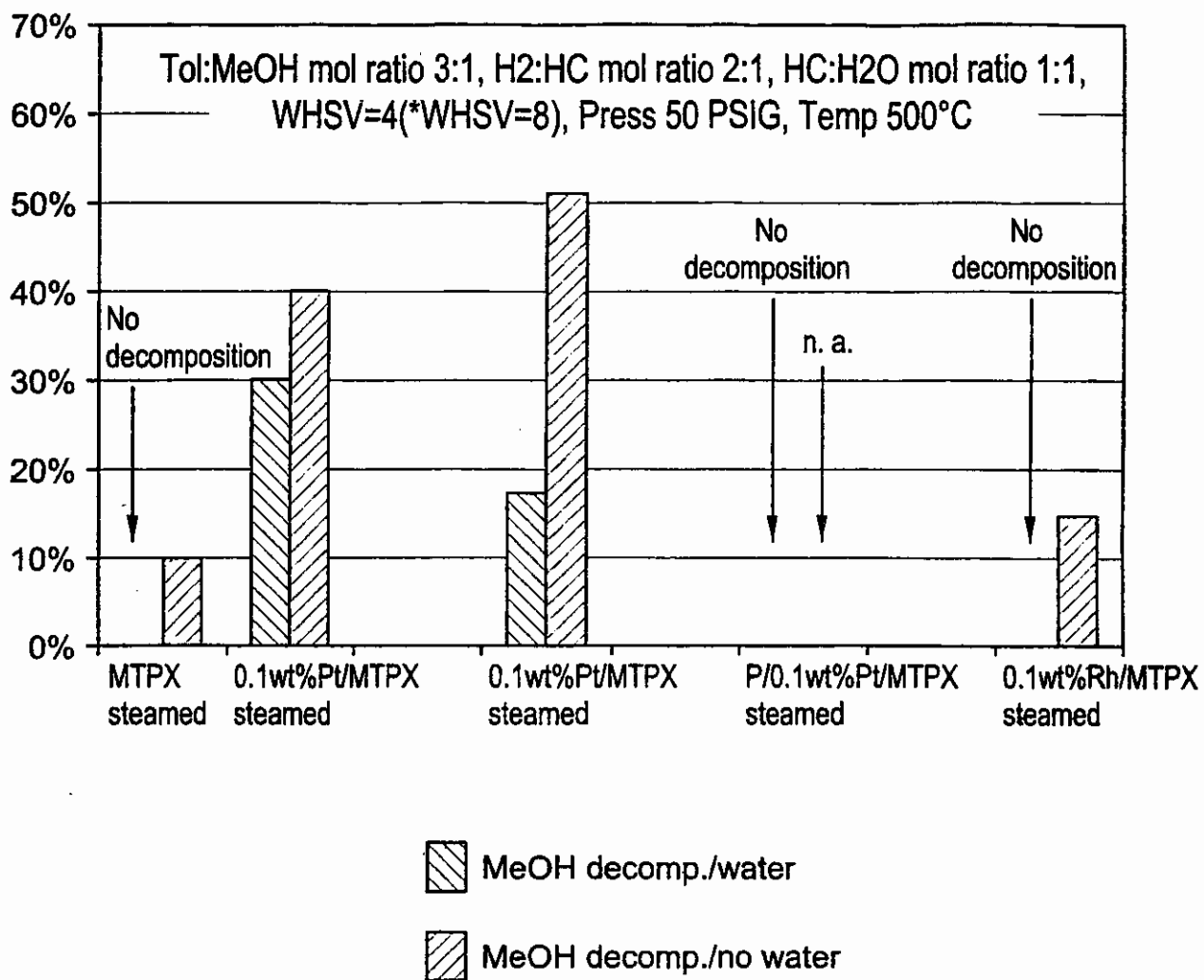
Toluene Methylation over Catalyst L

Tol:MeOH 3, H₂/HC 2, H₂HC 1, S.V. 8, Press 50 PSIG, Temp 500°C

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Fig. 13

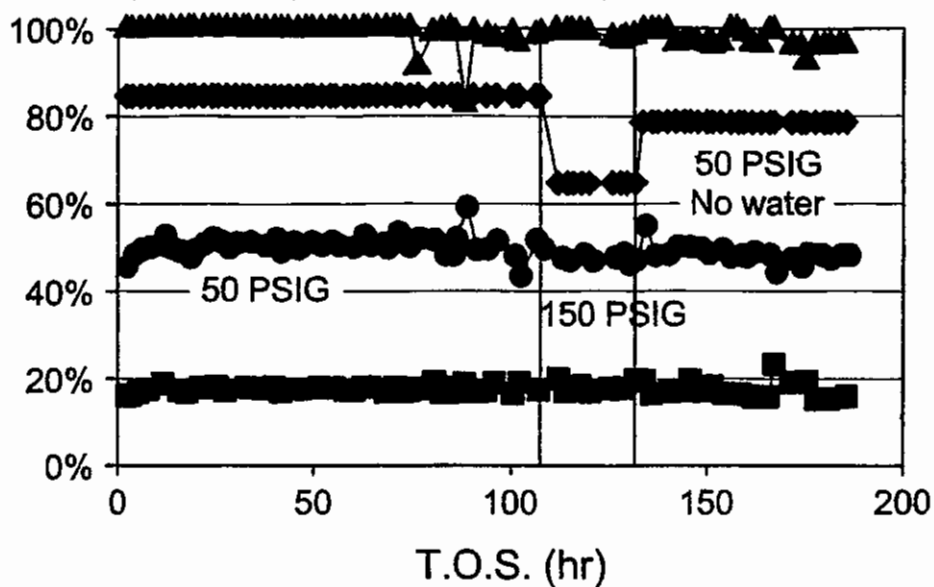
Effect of hydrogenation metals/water and phosphorus
on methanol decomposition



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Fig. 14

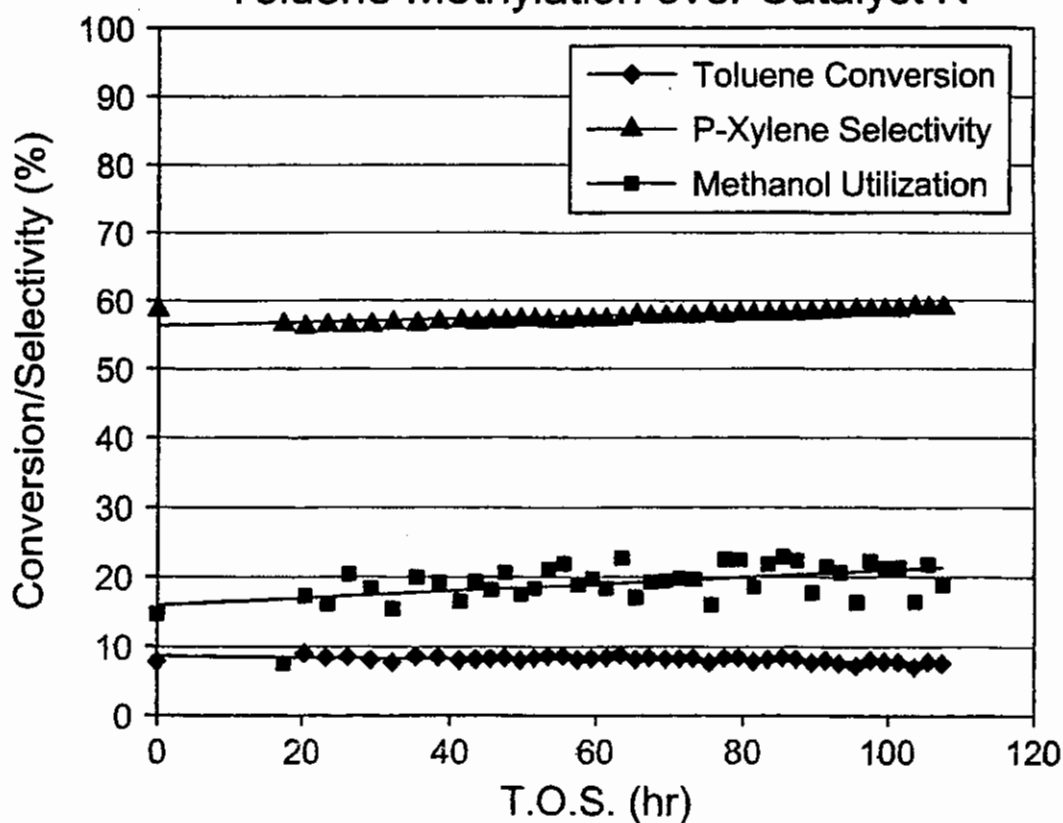
Toluene Methylation over Catalyst M

Tol:MeOH 3, H₂:HC 2, H₂O:HC 1, S.V. 8, Press 50 PSIG, Temp 500°C

◆ P-Sel ■ Toluene Conv. ▲ MeOH Conv. ● MeOH Util.

Fig. 15

Toluene Methylation over Catalyst N



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Fig. 16

Toluene Methylation over Catalyst O

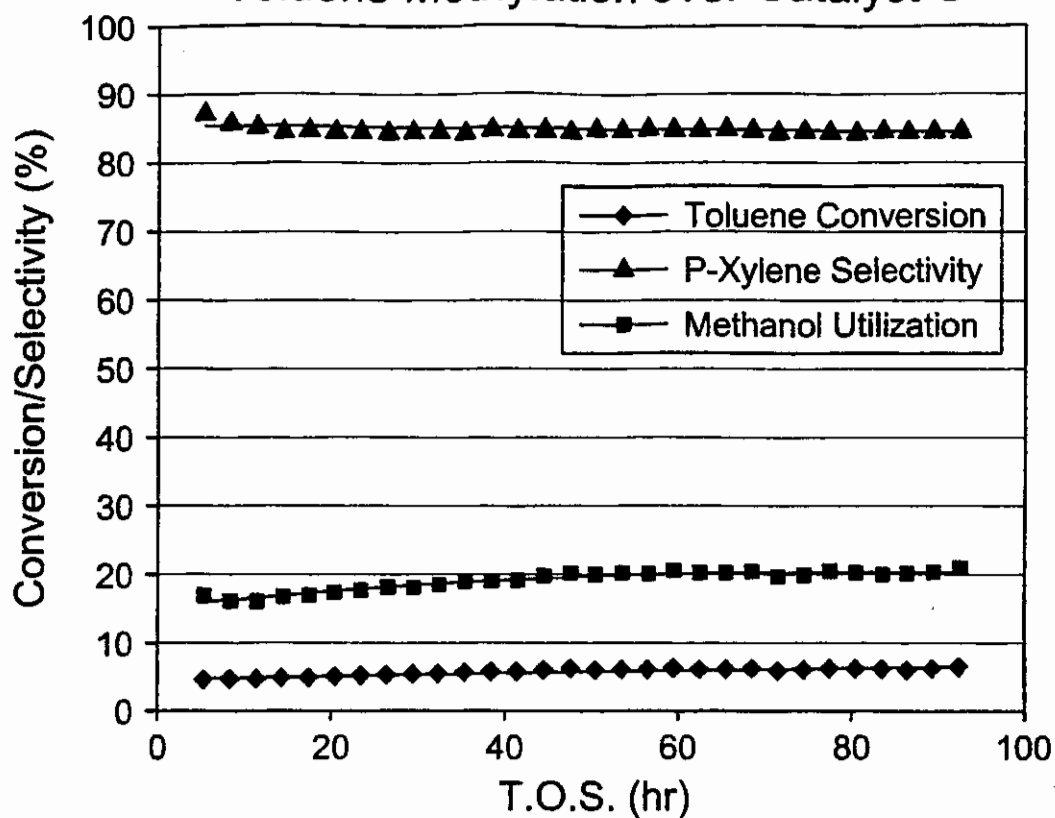
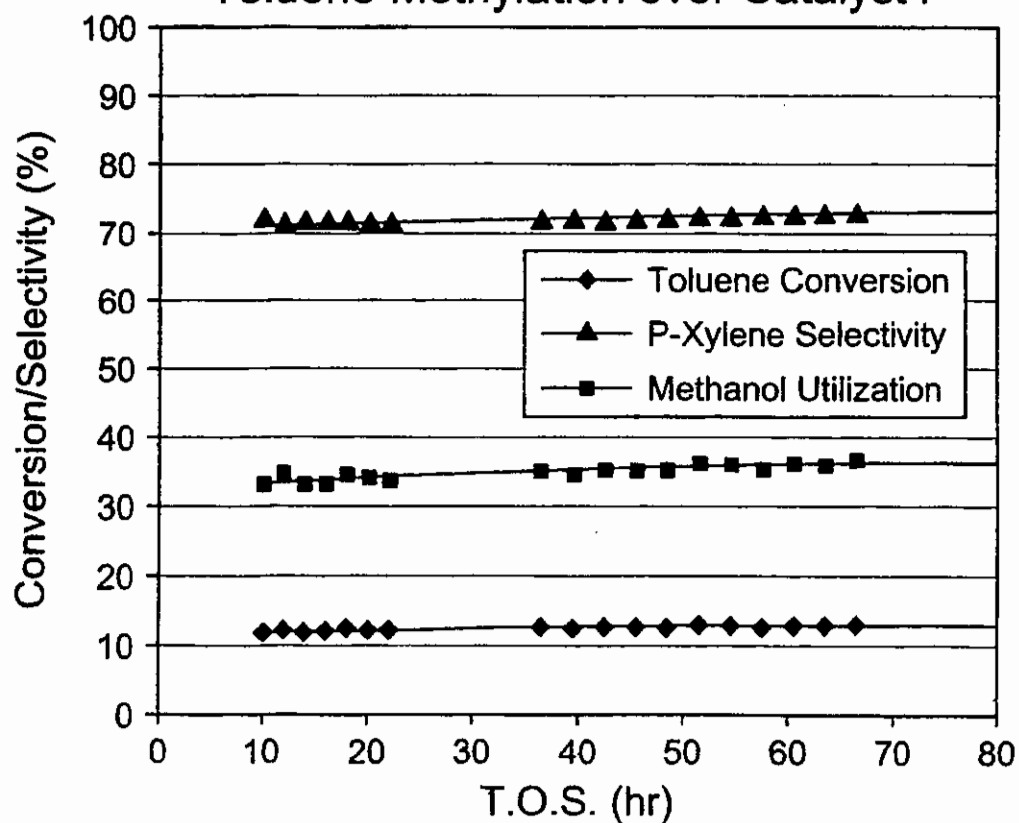


Fig. 17

Toluene Methylation over Catalyst P



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Fig. 18
Toluene Methylation over Catalyst Q

