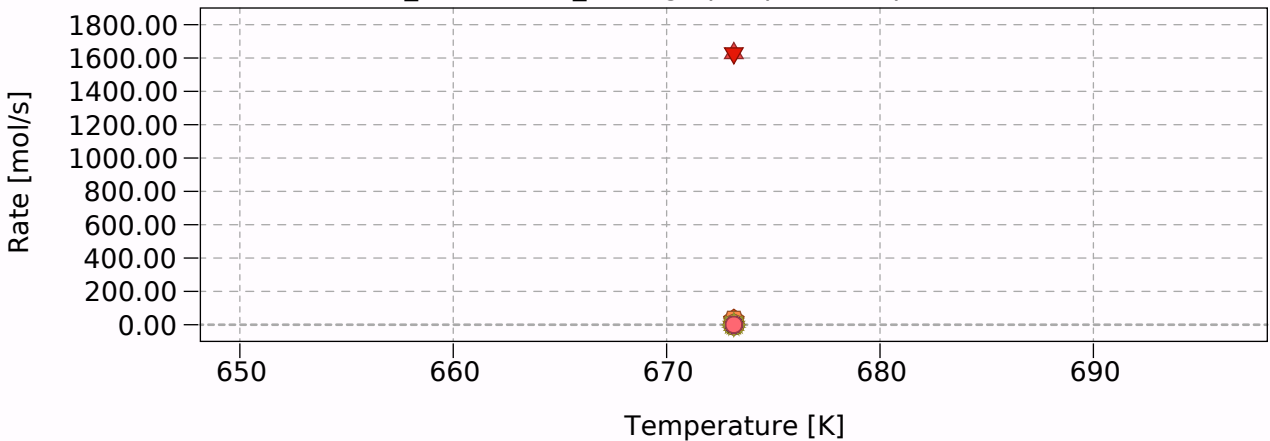


SEQUENCERUN\_2024-07-05\_1417/graphs/pdf/rates.pdf



- |  |   |
|--|---|
| ▲ $\text{CO}_2 + * \rightarrow \text{CO}_2^*$                                    | ▼ $\text{CO}_2 + * \leftarrow \text{CO}_2^*$                                    |
| ◆ $\text{CO} + * \rightarrow \text{CO}^*$  | ■ $\text{CO} + * \leftarrow \text{CO}^*$  |
| ⬠ $\text{H}_2 + 2 * \rightarrow 2 \text{H}^*$                                    | ⬠ $\text{H}_2 + 2 * \leftarrow 2 \text{H}^*$                                    |
| ⬠ $\text{CO}_2^* + * \rightarrow \text{CO}^* + \text{O}^*$                       | ⬠ $\text{CO}_2^* + * \leftarrow \text{CO}^* + \text{O}^*$                       |
| ⬠ $\text{CO}_2^* + \text{H}^* \rightarrow \text{HCOO}^* + *$                     | ✦ $\text{CO}_2^* + \text{H}^* \leftarrow \text{HCOO}^* + *$                     |
| ✦ $\text{CO}_2^* + \text{H}^* \rightarrow \text{COOH}^* + *$                     | ✦ $\text{CO}_2^* + \text{H}^* \leftarrow \text{COOH}^* + *$                     |
| ✦ $\text{CO}_2^* + \text{OH}^* \rightarrow \text{COOH}^* + \text{O}^*$           | ✦ $\text{CO}_2^* + \text{OH}^* \leftarrow \text{COOH}^* + \text{O}^*$           |
| ✦ $\text{CO}_2^* + \text{H}_2\text{O}^* \rightarrow \text{COOH}^* + \text{OH}^*$ | ● $\text{CO}_2^* + \text{H}_2\text{O}^* \leftarrow \text{COOH}^* + \text{OH}^*$ |
| ● $\text{CO}_2^* + \text{OH}^* \rightarrow \text{HCOO}^* + \text{O}^*$           | ● $\text{CO}_2^* + \text{OH}^* \leftarrow \text{HCOO}^* + \text{O}^*$           |
| ● $\text{CO}_2^* + \text{H}_2\text{O}^* \rightarrow \text{HCOO}^* + \text{OH}^*$ | ● $\text{CO}_2^* + \text{H}_2\text{O}^* \leftarrow \text{HCOO}^* + \text{OH}^*$ |
| ● $\text{COOH}^* + * \rightarrow \text{CO}^* + \text{OH}^*$                      | ● $\text{COOH}^* + * \leftarrow \text{CO}^* + \text{OH}^*$                      |
| ● $\text{COOH}^* + * \rightarrow \text{COH}^* + \text{O}^*$                      | ● $\text{COOH}^* + * \leftarrow \text{COH}^* + \text{O}^*$                      |
| ● $\text{HCOO}^* + * \rightarrow \text{O}^* + \text{HCO}^*$                      | ● $\text{HCOO}^* + * \leftarrow \text{O}^* + \text{HCO}^*$                      |
| ● $\text{CO}^* + * \rightarrow \text{C}^* + \text{O}^*$                          | ● $\text{CO}^* + * \leftarrow \text{C}^* + \text{O}^*$                          |
| ● $\text{HCO}^* + * \rightarrow \text{CO}^* + \text{H}^*$                        | ● $\text{HCO}^* + * \leftarrow \text{CO}^* + \text{H}^*$                        |
| ● $\text{HCO}^* + * \rightarrow \text{CH}^* + \text{O}^*$                        | ● $\text{HCO}^* + * \leftarrow \text{CH}^* + \text{O}^*$                        |
| ● $\text{COH}^* + * \rightarrow \text{CO}^* + \text{H}^*$                        | ● $\text{COH}^* + * \leftarrow \text{CO}^* + \text{H}^*$                        |
| ● $\text{COH}^* + * \rightarrow \text{C}^* + \text{OH}^*$                        | ● $\text{COH}^* + * \leftarrow \text{C}^* + \text{OH}^*$                        |
| ● $\text{C}^* + \text{H}^* \rightarrow \text{CH}^* + *$                          | ● $\text{C}^* + \text{H}^* \leftarrow \text{CH}^* + *$                          |
| ● $\text{CH}^* + \text{H}^* \rightarrow \text{CH}_2^* + *$                       | ● $\text{CH}^* + \text{H}^* \leftarrow \text{CH}_2^* + *$                       |
| ● $\text{CH}_2^* + \text{H}^* \rightarrow \text{CH}_3^* + *$                     | ● $\text{CH}_2^* + \text{H}^* \leftarrow \text{CH}_3^* + *$                     |
| ● $\text{HCO}^* + \text{H}^* \rightarrow \text{CH}_2\text{O}^* + *$              | ● $\text{HCO}^* + \text{H}^* \leftarrow \text{CH}_2\text{O}^* + *$              |
| ● $\text{HCO}^* + \text{H}^* \rightarrow \text{HCOH}^* + *$                      | ● $\text{HCO}^* + \text{H}^* \leftarrow \text{HCOH}^* + *$                      |
| ● $\text{COH}^* + \text{H}^* \rightarrow \text{HCOH}^* + *$                      | ● $\text{COH}^* + \text{H}^* \leftarrow \text{HCOH}^* + *$                      |
| ● $\text{HCOH}^* + * \rightarrow \text{CH}^* + \text{OH}^*$                      | ● $\text{HCOH}^* + * \leftarrow \text{CH}^* + \text{OH}^*$                      |
| ● $\text{HCOH}^* + \text{H}^* \rightarrow \text{CH}_2\text{OH}^* + *$            | ● $\text{HCOH}^* + \text{H}^* \leftarrow \text{CH}_2\text{OH}^* + *$            |
| ● $\text{CH}_2\text{OH}^* + * \rightarrow \text{CH}_2^* + \text{OH}^*$           | ● $\text{CH}_2\text{OH}^* + * \leftarrow \text{CH}_2^* + \text{OH}^*$           |
| ● $\text{CH}_2\text{OH}^* + \text{H}^* \rightarrow \text{CH}_3\text{OH}^* + *$   | ● $\text{CH}_2\text{OH}^* + \text{H}^* \leftarrow \text{CH}_3\text{OH}^* + *$   |
| ● $\text{CH}_2\text{O}^* + \text{H}^* \rightarrow \text{CH}_2\text{OH}^* + *$    | ● $\text{CH}_2\text{O}^* + \text{H}^* \leftarrow \text{CH}_2\text{OH}^* + *$    |
| ● $\text{CH}_2\text{O}^* + * \rightarrow \text{CH}_2^* + \text{O}^*$             | ● $\text{CH}_2\text{O}^* + * \leftarrow \text{CH}_2^* + \text{O}^*$             |
| ● $\text{CH}_2\text{O}^* + \text{H}^* \rightarrow \text{CH}_3\text{O}^* + *$     | ● $\text{CH}_2\text{O}^* + \text{H}^* \leftarrow \text{CH}_3\text{O}^* + *$     |
| ● $\text{CH}_3\text{O}^* + * \rightarrow \text{CH}_3^* + \text{O}^*$             | ● $\text{CH}_3\text{O}^* + * \leftarrow \text{CH}_3^* + \text{O}^*$             |
| ● $\text{CH}_3\text{O}^* + \text{H}^* \rightarrow \text{CH}_3\text{OH}^* + *$    | ● $\text{CH}_3\text{O}^* + \text{H}^* \leftarrow \text{CH}_3\text{OH}^* + *$    |
| ● $\text{CH}_3\text{OH}^* + * \rightarrow \text{CH}_3^* + \text{OH}^*$           | ● $\text{CH}_3\text{OH}^* + * \leftarrow \text{CH}_3^* + \text{OH}^*$           |
| ● $\text{O}^* + \text{H}^* \rightarrow \text{OH}^* + *$                          | ● $\text{O}^* + \text{H}^* \leftarrow \text{OH}^* + *$                          |
| ● $\text{OH}^* + \text{H}^* \rightarrow \text{H}_2\text{O}^* + *$                | ● $\text{OH}^* + \text{H}^* \leftarrow \text{H}_2\text{O}^* + *$                |
| ● $\text{OH}^* + \text{OH}^* \rightarrow \text{O}^* + \text{H}_2\text{O}^*$      | ● $\text{OH}^* + \text{OH}^* \leftarrow \text{O}^* + \text{H}_2\text{O}^*$      |
| ● $\text{H}_2\text{O} + * \rightarrow \text{H}_2\text{O}^*$                      | ● $\text{H}_2\text{O} + * \leftarrow \text{H}_2\text{O}^*$                      |
| ● $\text{CH}_4 + 2 * \rightarrow \text{CH}_3^* + \text{H}^*$                     | ● $\text{CH}_4 + 2 * \leftarrow \text{CH}_3^* + \text{H}^*$                     |
| ● $\text{CH}_3\text{OH} + * \rightarrow \text{CH}_3\text{OH}^*$                  | ● $\text{CH}_3\text{OH} + * \leftarrow \text{CH}_3\text{OH}^*$                  |
| ● $\text{CH}_2\text{O} + * \rightarrow \text{CH}_2\text{O}^*$                    | ● $\text{CH}_2\text{O} + * \leftarrow \text{CH}_2\text{O}^*$                    |