

! 1. Kalorimetrie, přepočet U a H =====  
 m=0.586 ! [g] **0.586**  
 M=58.08 ! [g mol<sup>-1</sup>] **58.08**  
 C=5640 ! [J K<sup>-1</sup>] **5640**  
 dt=24.56-22.87 ! [K] **1.69**  
 Q=-C\*dt ! [J] **-9531.6**  
 n=m/M ! [mol] **0.01009**  
 DUm=Q/n ! [J mol<sup>-1</sup>] **-9.447 · 10<sup>+05</sup>**  
 ! CH<sub>3</sub>COCH<sub>3</sub>(l) + 4 O<sub>2</sub>(g) -> 3 CO<sub>2</sub>(g) + 3 H<sub>2</sub>O(l)  
 dn=-1 **-1**  
 T=298.15 ! [K] **298.15**  
 DHm=DUm+dn\*R\*T ! [J mol<sup>-1</sup>] **-9.4718 · 10<sup>+05</sup>**

! 2. Hessův zákon =====  
 m=500 ! [g] **500**  
 nprop=0.40\*m/M(C<sub>3</sub>H<sub>8</sub>) ! [mol] **4.5356**  
 nbut= 0.60\*m/M(C<sub>4</sub>H<sub>10</sub>) ! [mol] **5.1615**  
 ! C<sub>3</sub>H<sub>8</sub> + x O<sub>2</sub> -> 3 CO<sub>2</sub> + 4 H<sub>2</sub>O  
 DHprop=(3\*(-393)+4\*(-242)-(-104))\*1e3 ! [J mol<sup>-1</sup>] **-2.043 · 10<sup>+06</sup>**  
 ! C<sub>4</sub>H<sub>10</sub> + x O<sub>2</sub> -> 4 CO<sub>2</sub> + 5 H<sub>2</sub>O  
 DHbut=(4\*(-393)+5\*(-242)-(-126))\*1e3 ! [J mol<sup>-1</sup>] **-2.656 · 10<sup>+06</sup>**  
 DH=nprop\*DHprop+nbut\*DHbut ! [J] **-2.2975 · 10<sup>+07</sup>**  
 Q=-DH\*0.70 ! [J] **1.6083 · 10<sup>+07</sup>**  
 dt=75 ! [K] **75**  
 Cspw=4.2e3 ! [J kg<sup>-1</sup> K<sup>-1</sup>] **4200**  
 m=Q/dt/Cspw ! [kg] **51.056**

! 3. Hessův zákon -- spalné enthalpie =====  
 ! 2 C + 2 H<sub>2</sub> -> C<sub>2</sub>H<sub>4</sub>  
 DHs1 = 2\*-393.5 + 2\*-285.8 --1411.0 ! [kJ mol<sup>-1</sup>] **52.4**

! 4. Hess + Kirchhoff =====  
 ! C<sub>4</sub>H<sub>6</sub> + 2 H<sub>2</sub> -> C<sub>4</sub>H<sub>10</sub>  
 DH298=(-126-110)\*1e3 ! [J mol<sup>-1</sup>] **-2.36 · 10<sup>+05</sup>**  
 DCpm=95-119-2\*29 ! [J K<sup>-1</sup> mol<sup>-1</sup>] **-82**  
 DH=DH298+(200-25)\*DCpm ! [J K<sup>-1</sup> mol<sup>-1</sup>] **-2.5035 · 10<sup>+05</sup>**

! 5. Entalpická bilance =====  
 ! C<sub>2</sub>H<sub>4</sub> + H<sub>2</sub>O -> C<sub>2</sub>H<sub>5</sub>OH  
 DH298=(-235--242-52)\*1e3 ! [J mol<sup>-1</sup>] **-45000**  
 Cpprod=90 ! [J K<sup>-1</sup> mol<sup>-1</sup>] **90**  
 Cpvych=48+35 ! [J K<sup>-1</sup> mol<sup>-1</sup>] **83**  
 ! a) -----  
 DH=Cpvych\*(298-400)+DH298+Cpprod\*(600-298) ! [J mol<sup>-1</sup>] **-26286**  
 ! b) -----  
 Cpprod=90\*0.7+0.3\*(48+35) ! [J K<sup>-1</sup> mol<sup>-1</sup>] **87.9**  
 DH=Cpvych\*(298-400)+0.7\*DH298+Cpprod\*(600-298) !  
 [J mol<sup>-1</sup>] **-13420**

! 6. Entalpická bilance =====  
 ! CaO + n H<sub>2</sub>O -> Ca(OH)<sub>2</sub> + (n-1) H<sub>2</sub>O  
 def Cpprod=(n-1)\*75+90 ! [J K<sup>-1</sup> mol<sup>-1</sup>]  
 DH=-986e3-(-635e3)-(-286e3) ! [J mol<sup>-1</sup>] **-65000**  
 solve n DH+(100-25)\*Cprod ! [mol] **11.356**  
 mCaO=1\*M(CaO) ! [g] **56.077**  
 mH<sub>2</sub>O=n\*M(H<sub>2</sub>O) ! [g] **204.57**  
 mH<sub>2</sub>O/mCaO **3.6481**