

# Optimal renewable production of ammonia from water and air.

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## Direct Cooling Reactor

Below in Figures S1 shows the profiles of the pressure drop. Next, Figures S2-S4 show different temperature profiles corresponding to reacting gas temperature, the temperature in the external annulus, Fig. S3, and the temperature of the gas ascending through the inner pipe, Figure S4.

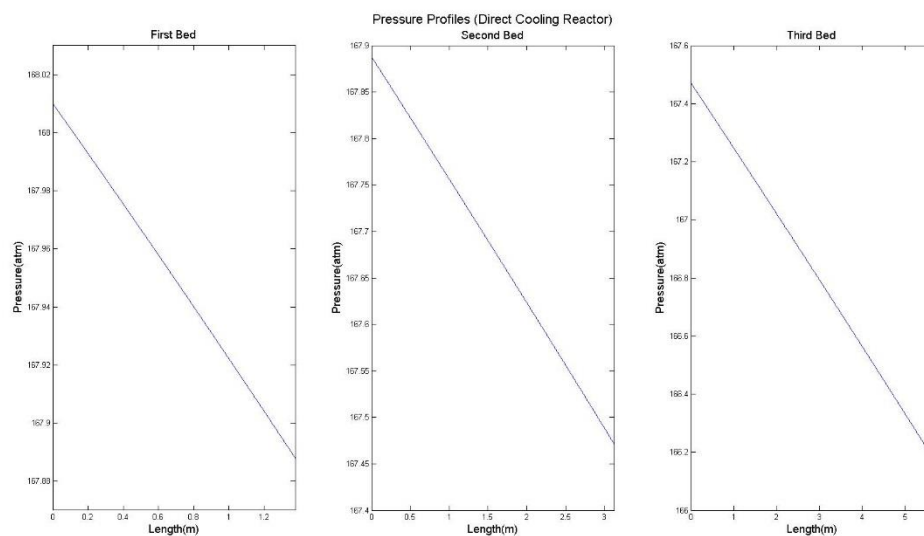


Figure S1.-Pressure drop across the three beds: Direct cooling

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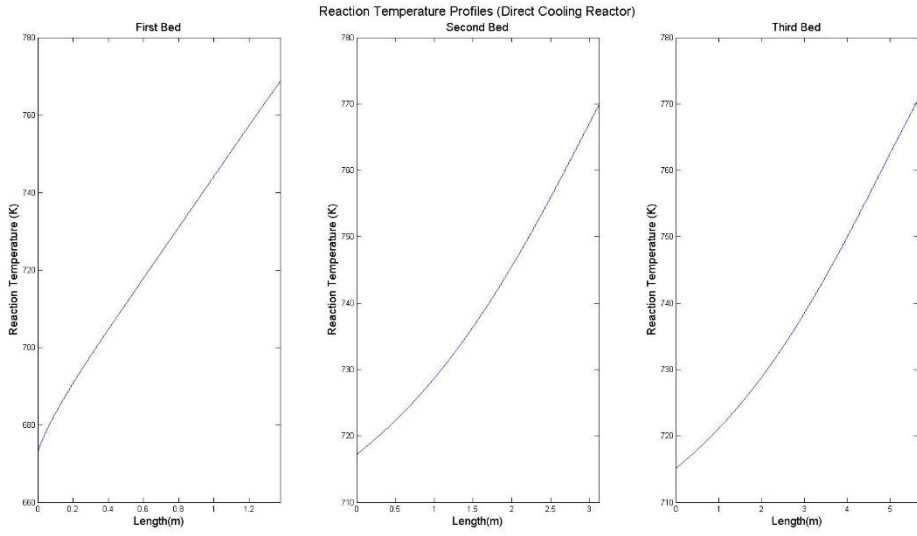


Figure S2.-Reacting Temperature across the three beds: Direct cooling

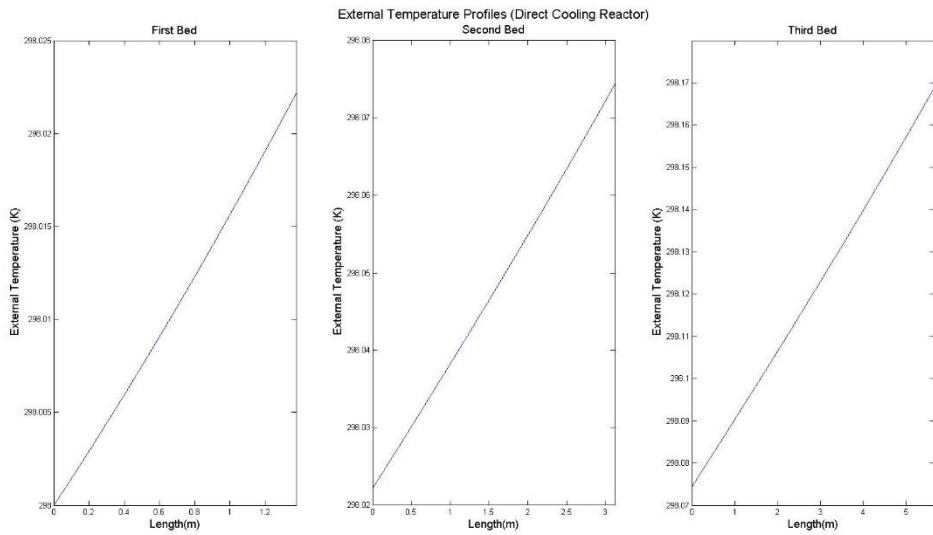


Figure S3.-Annulus Temperature across the three beds: Direct cooling

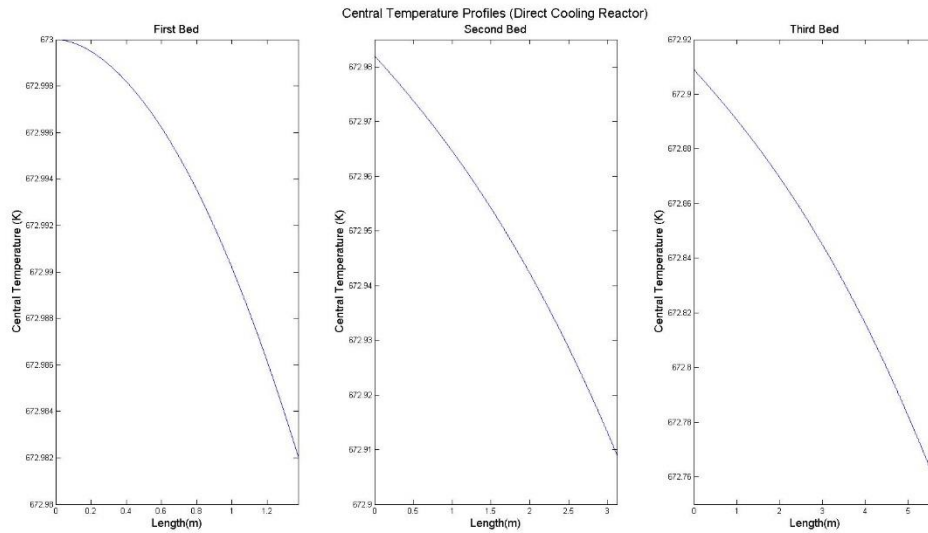


Figure S4.-Inner gas temperature across the three beds: Direct cooling

### Indirect Cooling Reactor

Figure S5 shows the pressure drop profile across the three beds in case of the indirect cooled reactor solved in section 4 of the main manuscript. Furthermore, Figures S6 and S7 show the temperature profiles of the reacting gas and the external annulus flow rate.

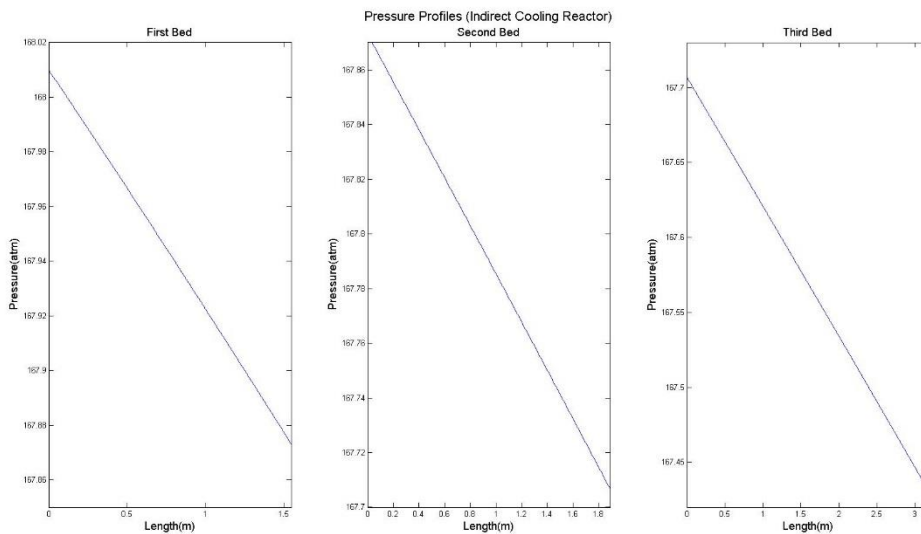


Figure S5.-Pressure drop across the three beds: Indirect cooling

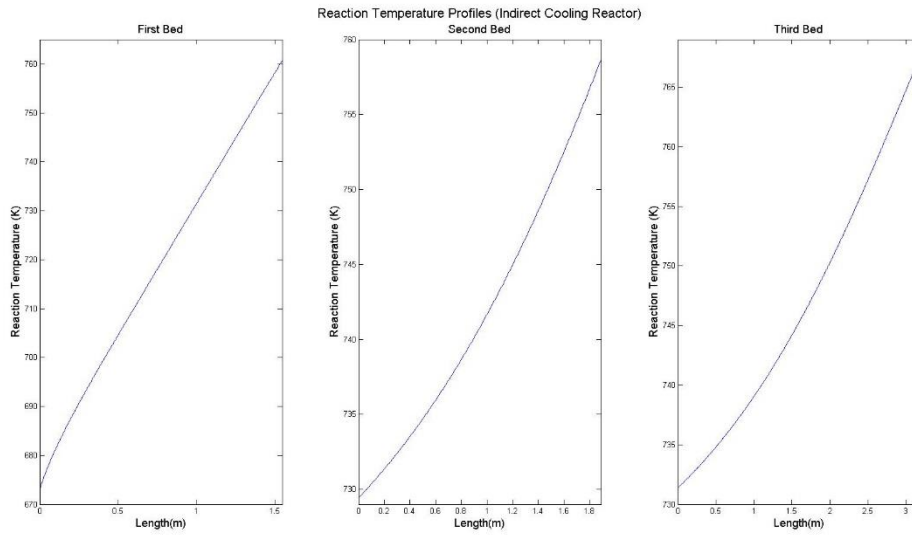


Figure S6.-Reacting Temperature across the three beds: Indirect cooling

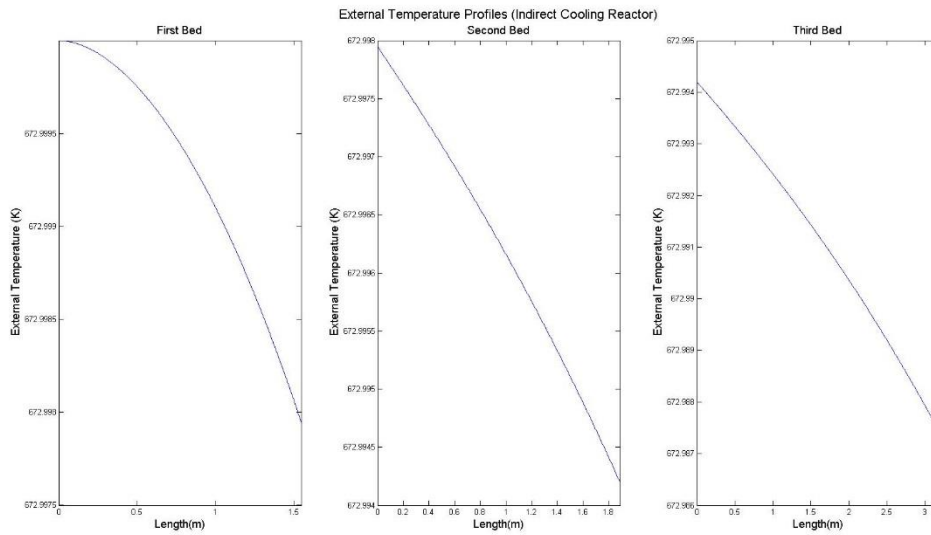


Figure S7.-Annuly's gas temperature across the three beds: Indirect cooling

