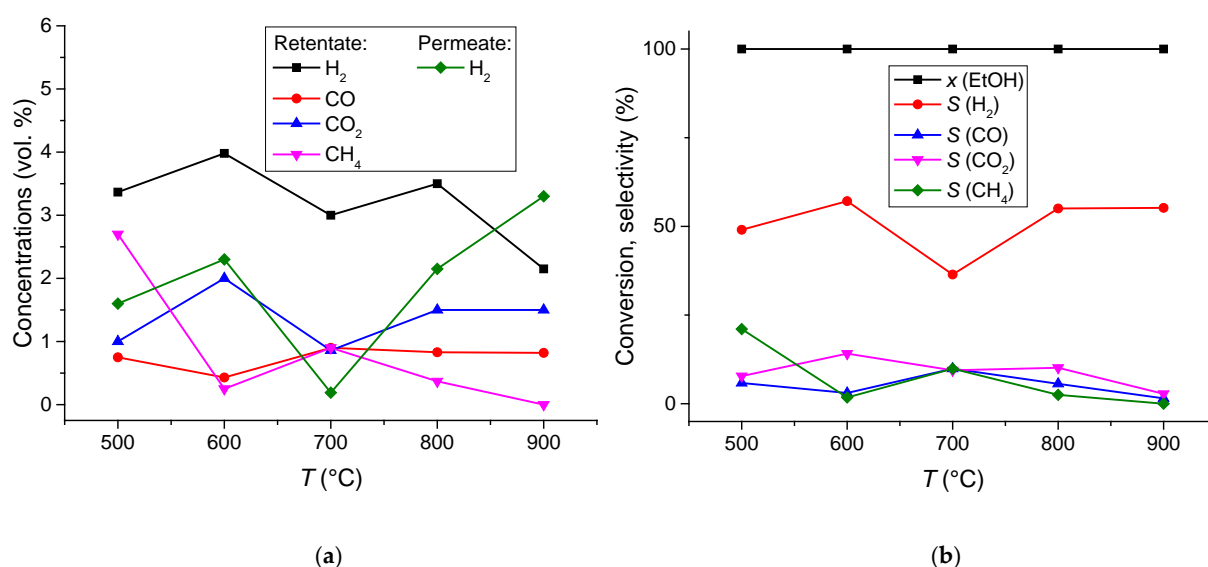# An experimental performance study of a catalytic membrane reactor for ethanol steam reforming over a metal honeycomb catalyst
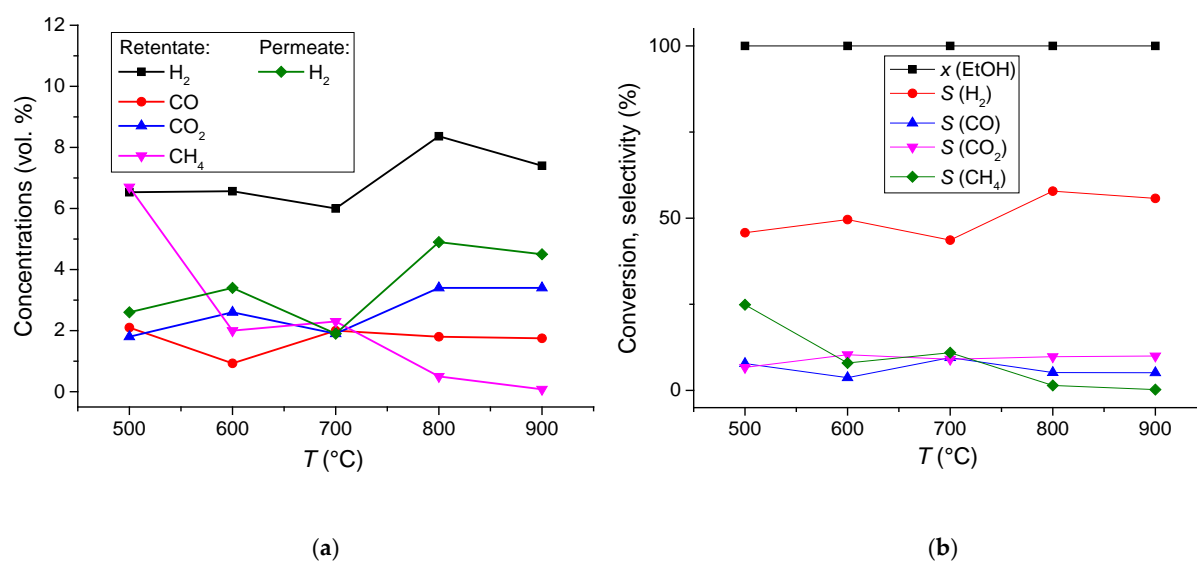
Nikita Eremeev, Alexey Krasnov, Yuliya Bespalko, Ludmilla Bobrova, Oleg Smorygo and Vladislav Sadykov
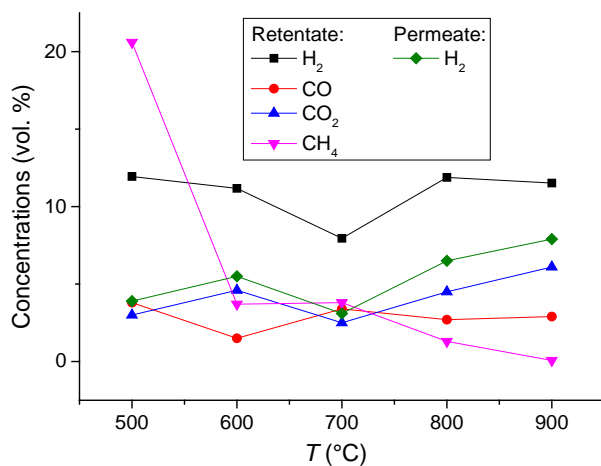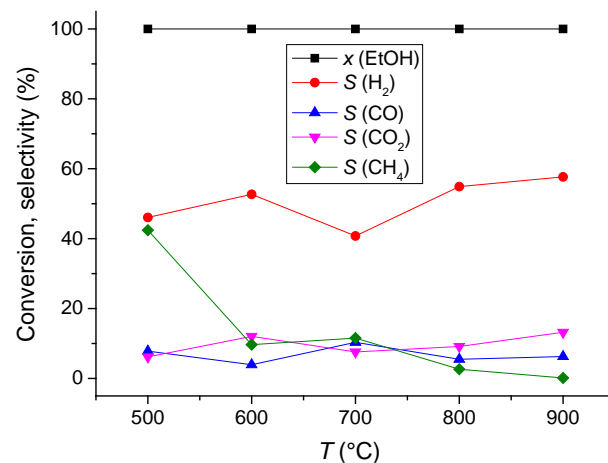
Supplementary materials

S/E = 6

(**a**)   (**b**)

Figure S1. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 6, ethanol inlet concentration 3 vol. %.

(**a**)   (**b**)

Figure S2. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 6, ethanol inlet concentration 6 vol. %.
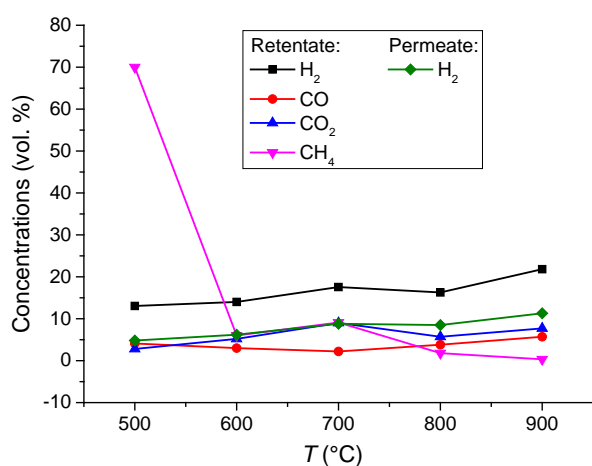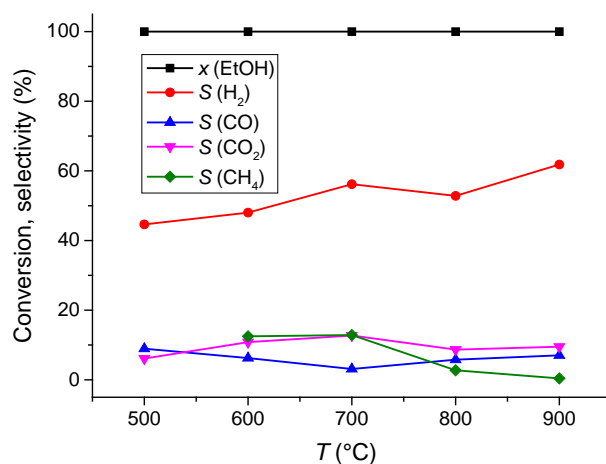
Figure S3. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 6, ethanol inlet concentration 8 vol. %.
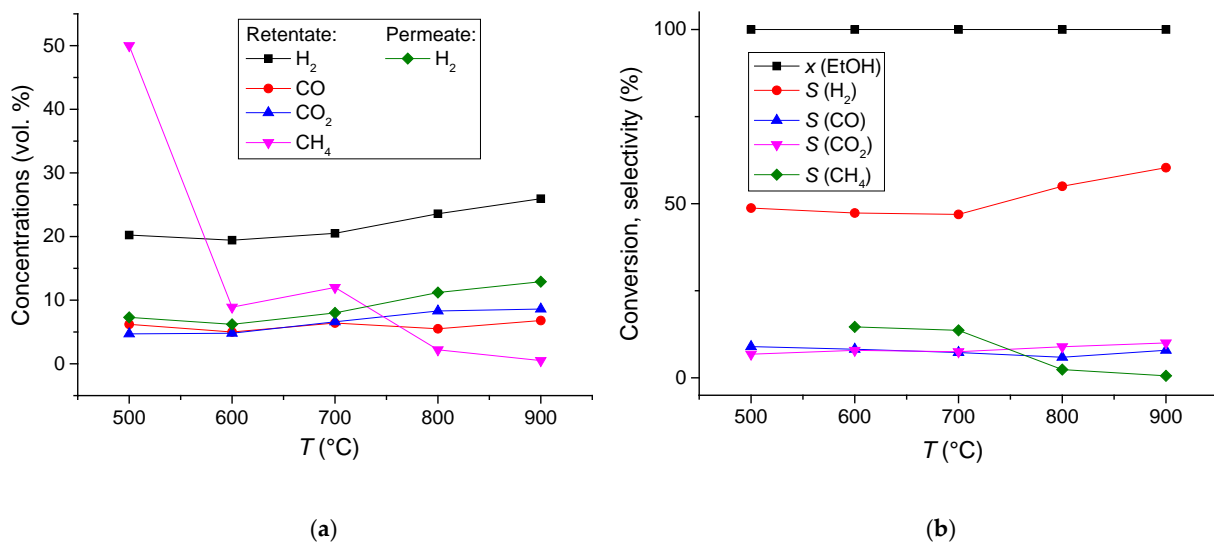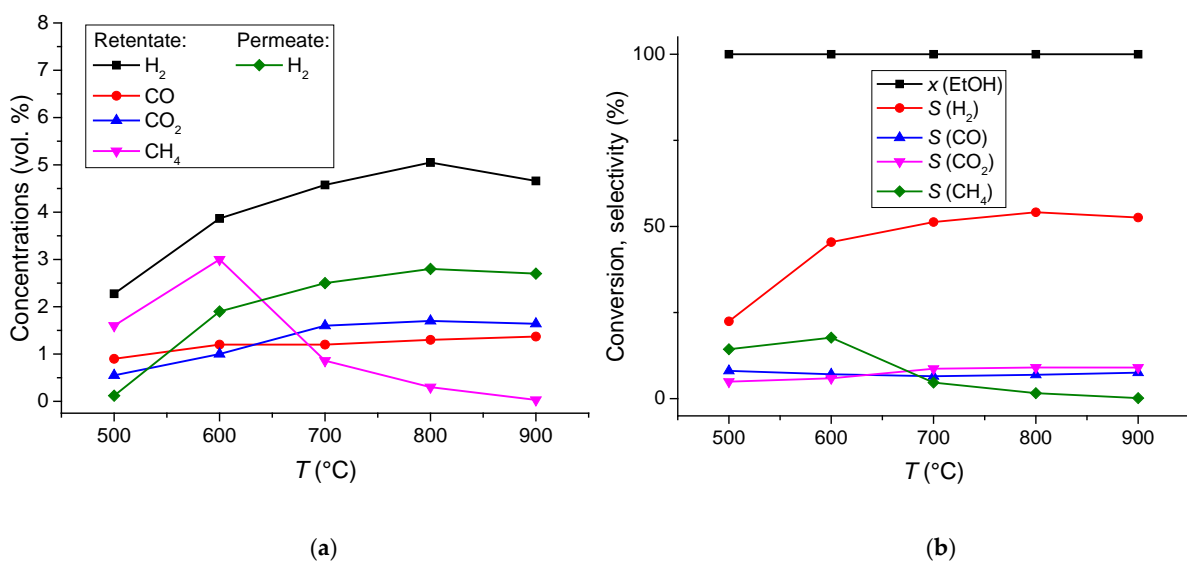

Figure S4. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 6, ethanol inlet concentration 11 vol. %.
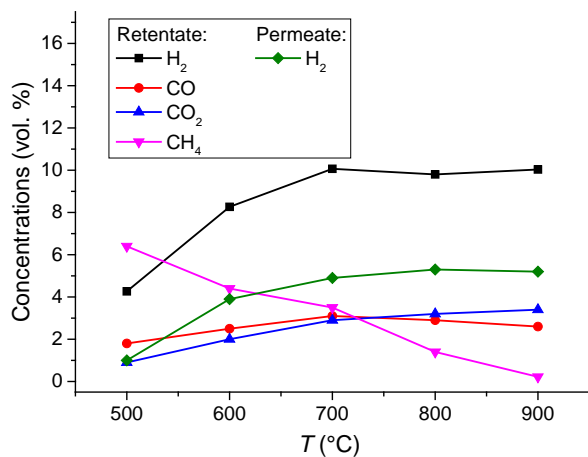
Figure S5. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 6, ethanol inlet concentration 14 vol. %.
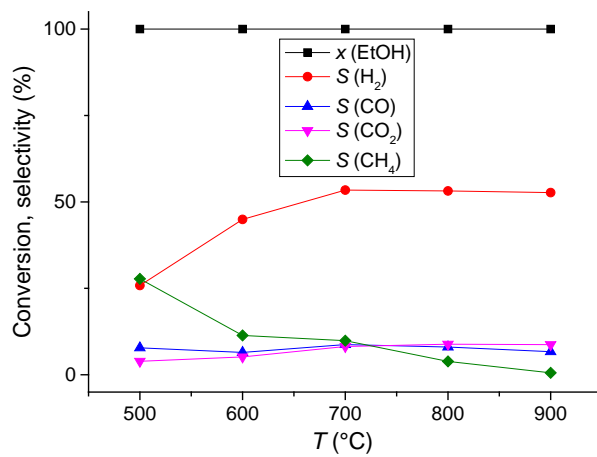
S/E = 4

Figure S6. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 4, ethanol inlet concentration 4 vol. %.
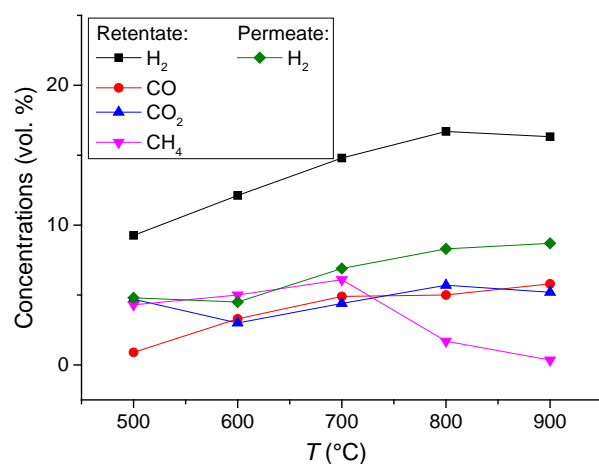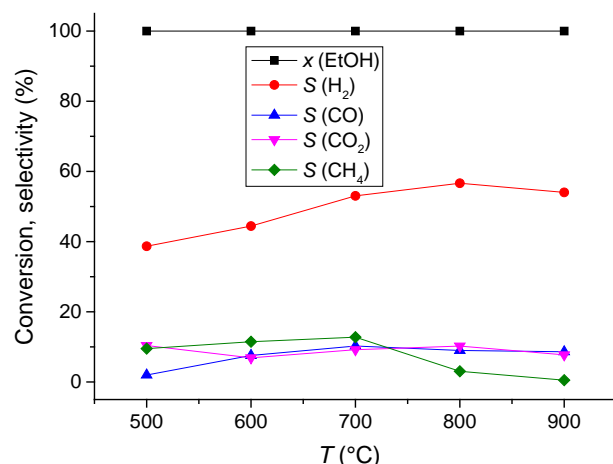
Figure S7. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 4, ethanol inlet concentration 8 vol. %.
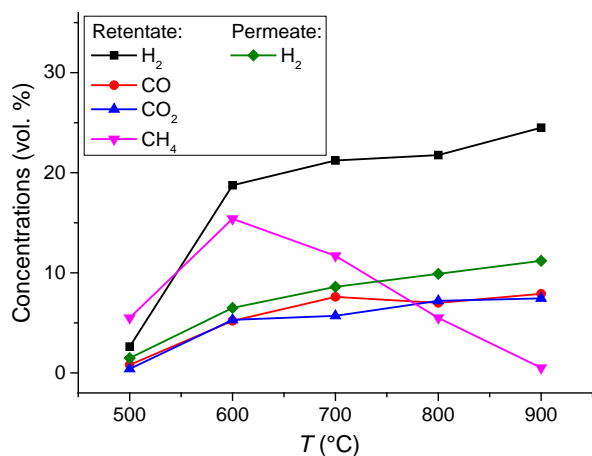

Figure S8. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 4, ethanol inlet concentration 12 vol. %.
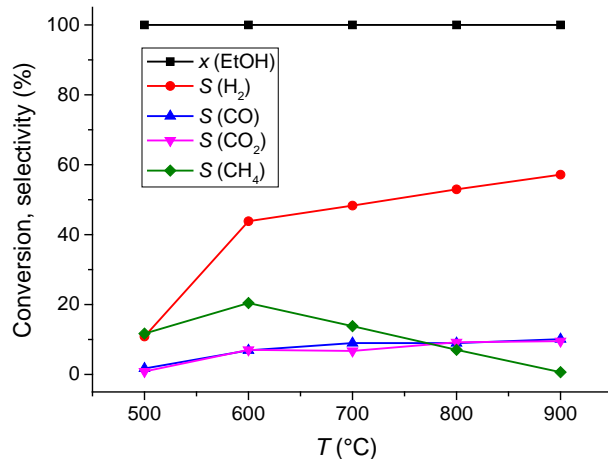
Figure S9. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 4, ethanol inlet concentration 16 vol. %.
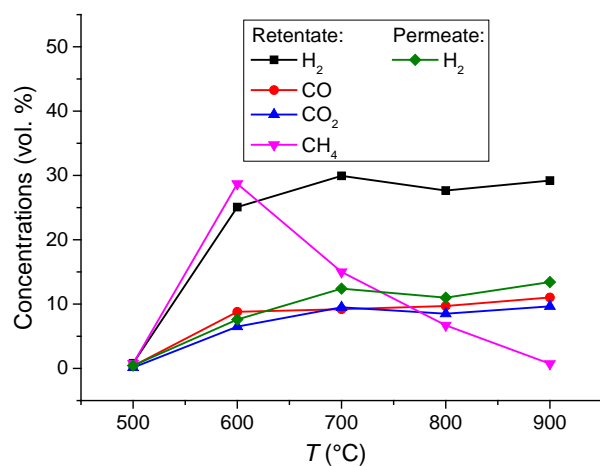

Figure S10. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 4, ethanol inlet concentration 20 vol. %.
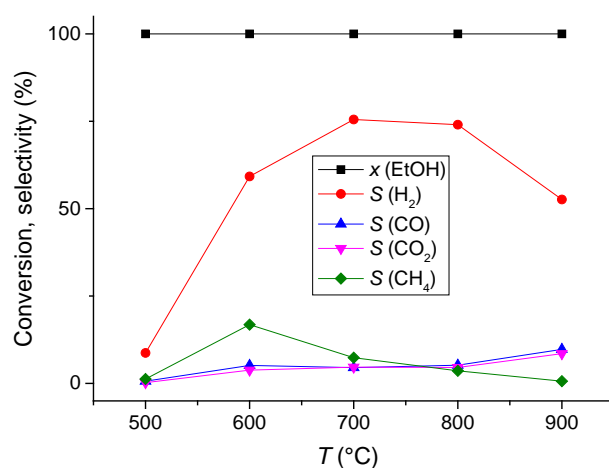
S/E = 2

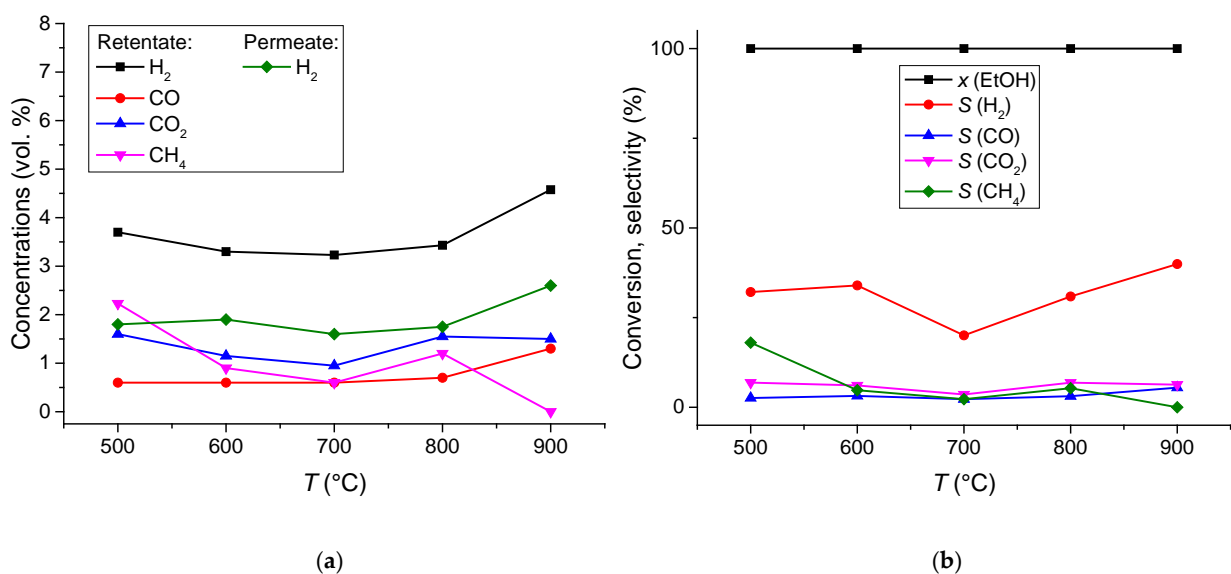(**a**)   (**b**)
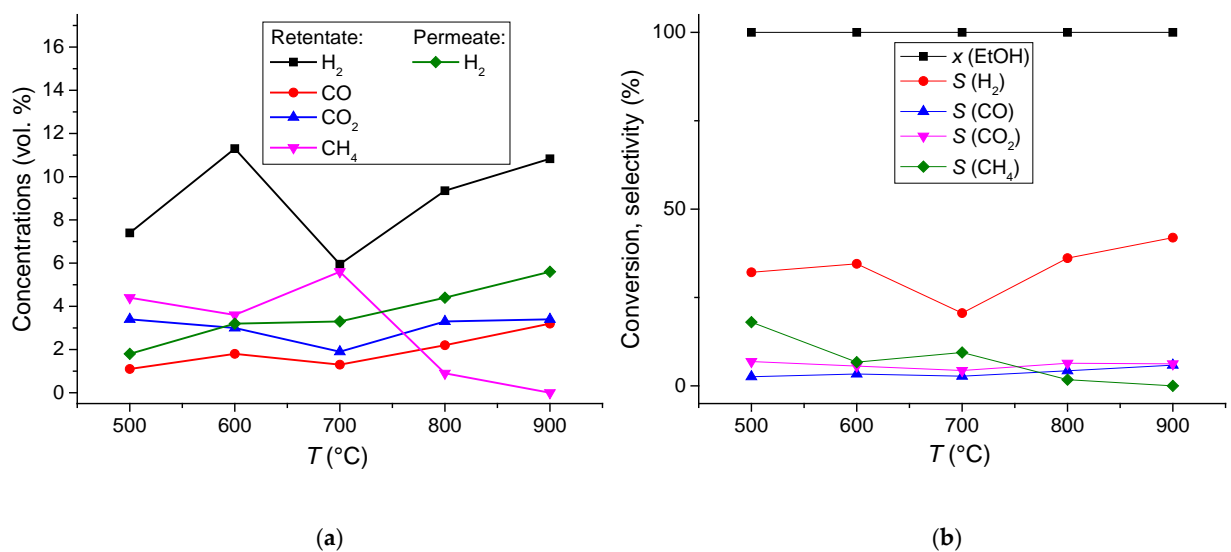
Figure S11. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 2, ethanol inlet concentration 6 vol. %.

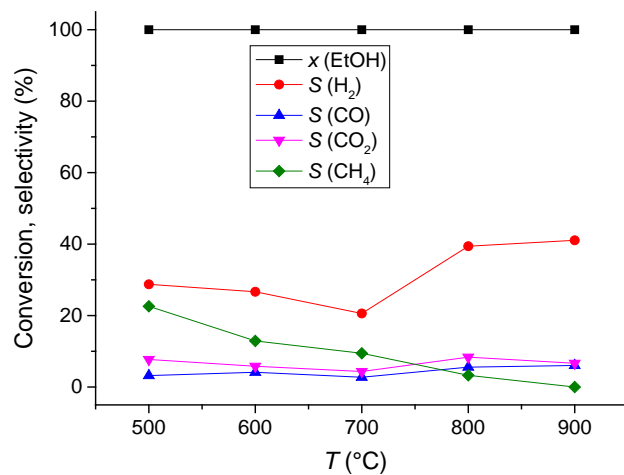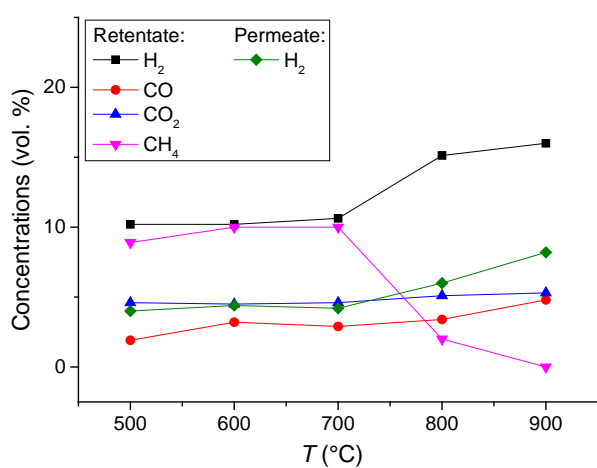(**a**)   (**b**)

Figure S12. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 2, ethanol inlet concentration 13 vol. %.

Figure S13. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 2, ethanol inlet concentration 20 vol. %.
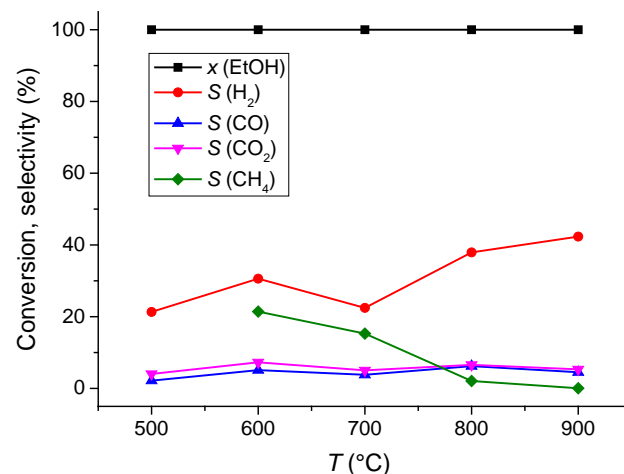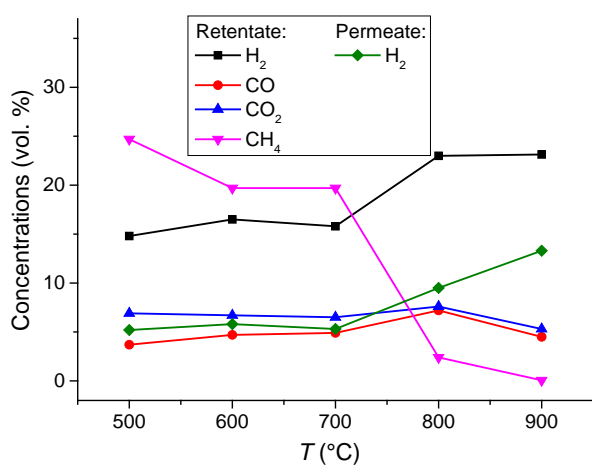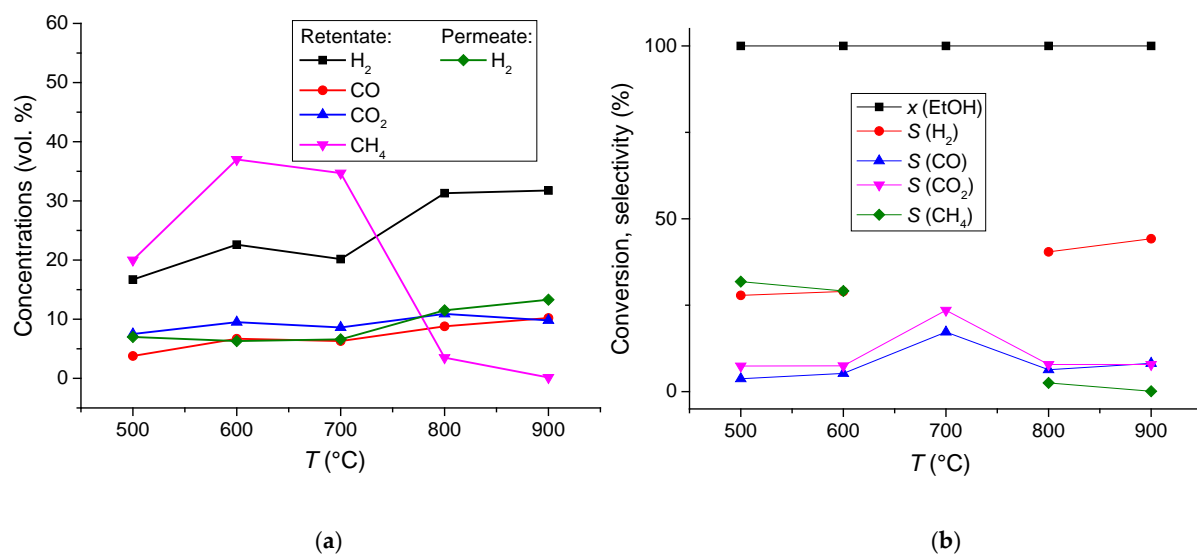

Figure S14. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 2, ethanol inlet concentration 27 vol. %.

Figure S15. Dependencies of ethanol steam reforming products concentrations (**a**), ethanol conversion and product selectivities (**b**) on temperature. Steam to ethanol ratio 2, ethanol inlet concentration 33 vol. %.