

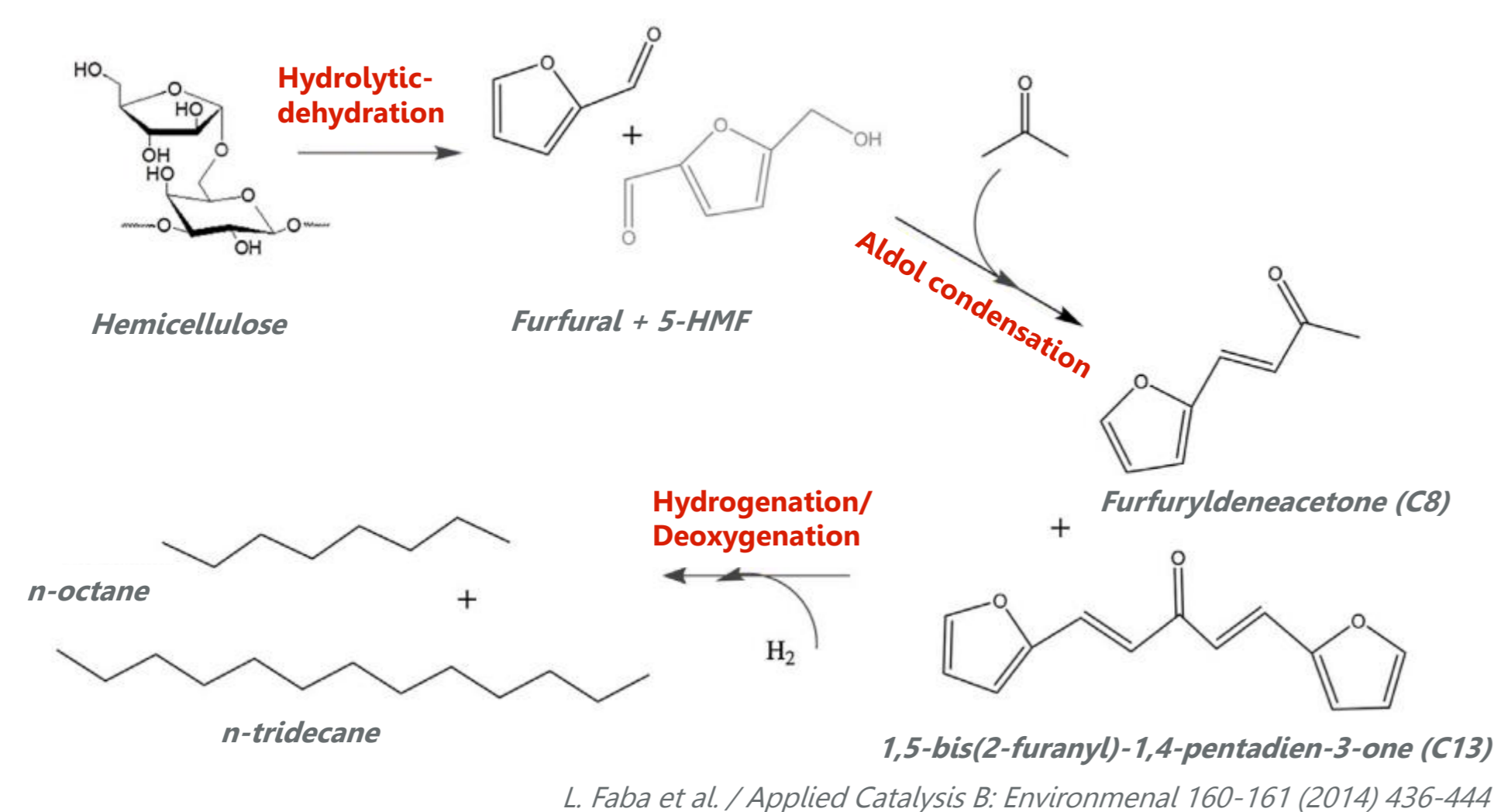


## INTRODUCTION

The aldol condensation is an organic synthesis reaction, which produces interesting platform molecules from furfural and acetone.

The hydrodeoxygenation of these furfural-acetone aldol condensation adducts means a valuable catalytic upgrading into n-alkanes in the gasoline or kerosene range.

The conventional sulfided catalysts (NiMoS/Al<sub>2</sub>O<sub>3</sub> and CoMoS/Al<sub>2</sub>O<sub>3</sub>) suffer a fast deactivation during the raw material's hydrotreatment. The co-processing with gasoil, using isopropanol as co-solvent, seems to be a promising alternative route for the hydrotreating of these platform molecules.



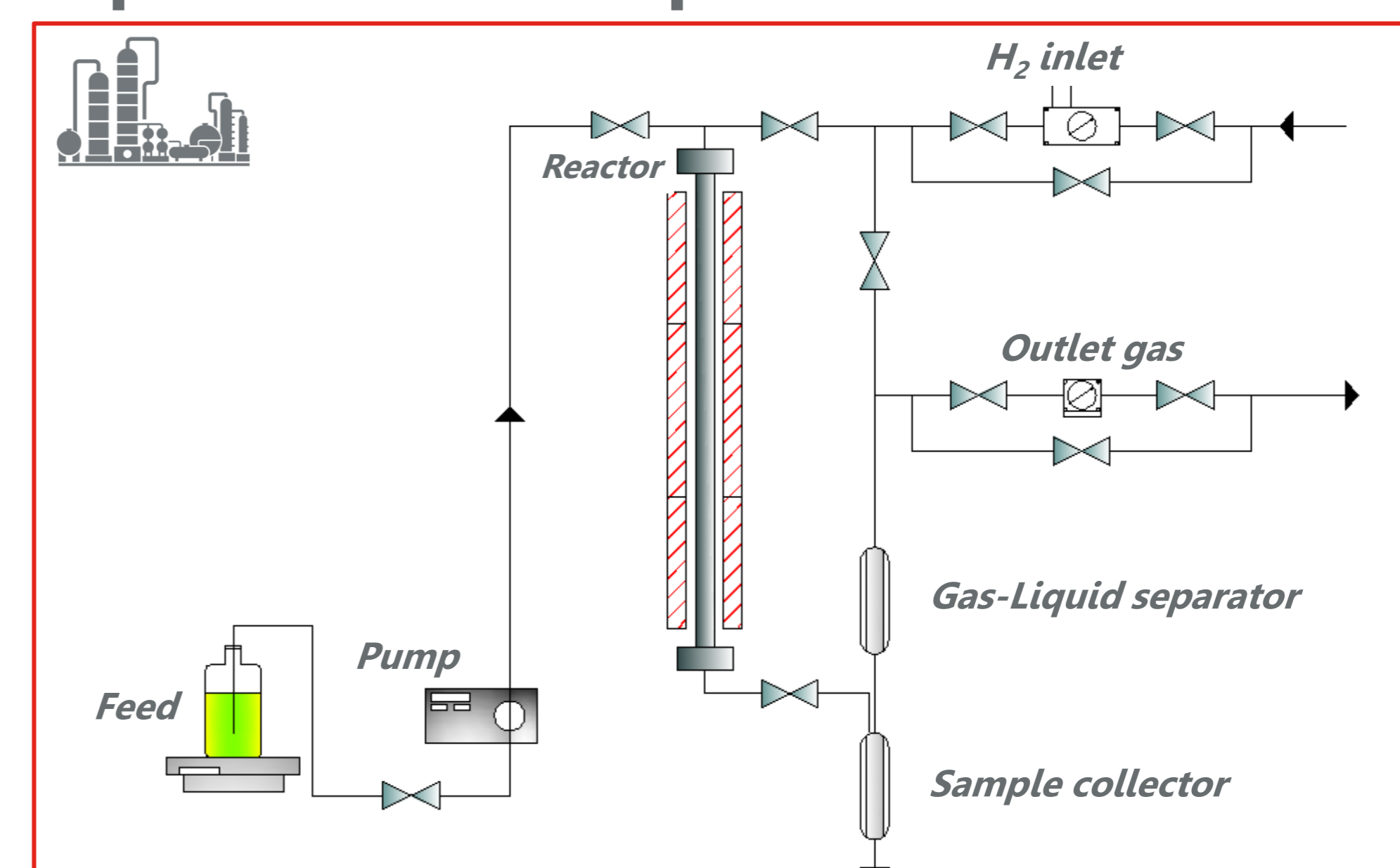
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This study reports the co-processing of atmospheric gas oil, furfural-acetone adducts and isopropanol using hydrotreating industrial conditions and commercial catalysts.



## EXPERIMENTAL

### Experimental setup



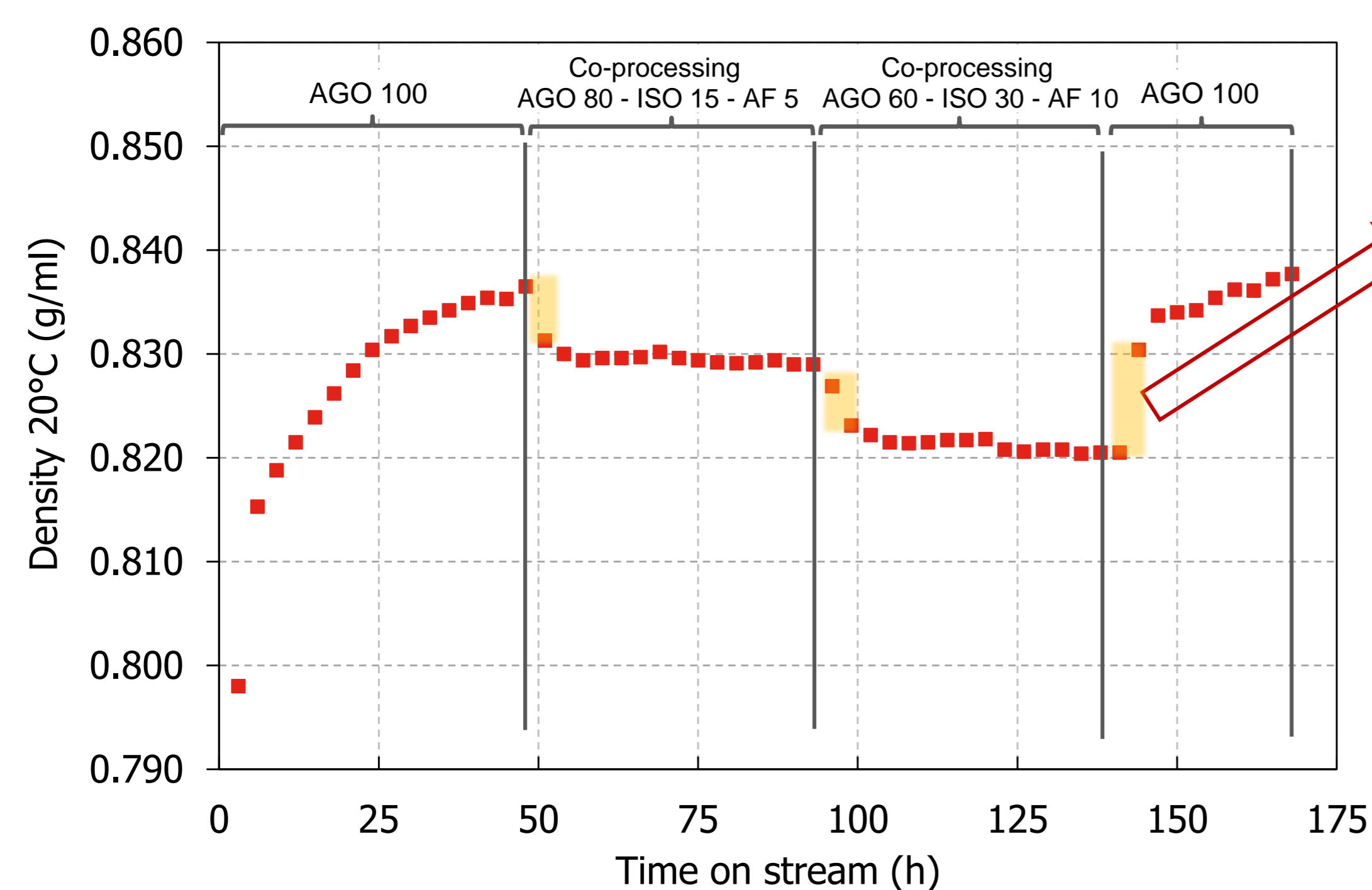
### Operating conditions

Parameter	Value	Unit
Temperature	220 (top) 320 (middle and bottom)	°C
Pressure	5.5	MPa
WHSV	0.5	h <sup>-1</sup>
Co-processing ratio	Atmospheric gas oil (AGO): 80 - 60 Isopropanol (ISO): 15 - 30 Furfural-acetone adducts (AF): 5 - 10	%
Catalyst	100 (commercial CoMo/Al <sub>2</sub> O <sub>3</sub> )	g
H <sub>2</sub> flow rate	120	NL/h



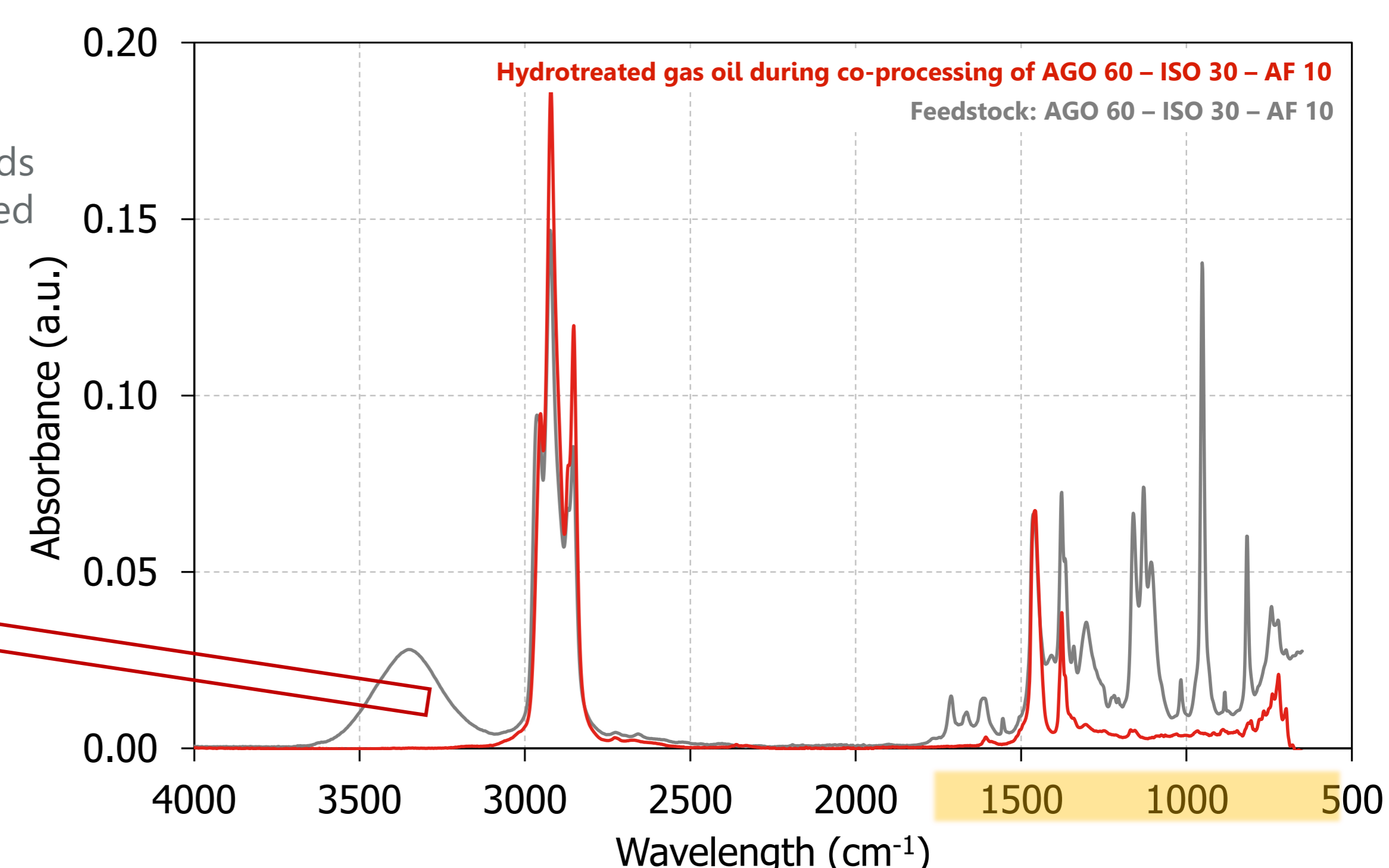
## RESULTS AND DISCUSSION

### Co-processing of atmospheric gas oil, isopropanol and furfural-acetone adducts

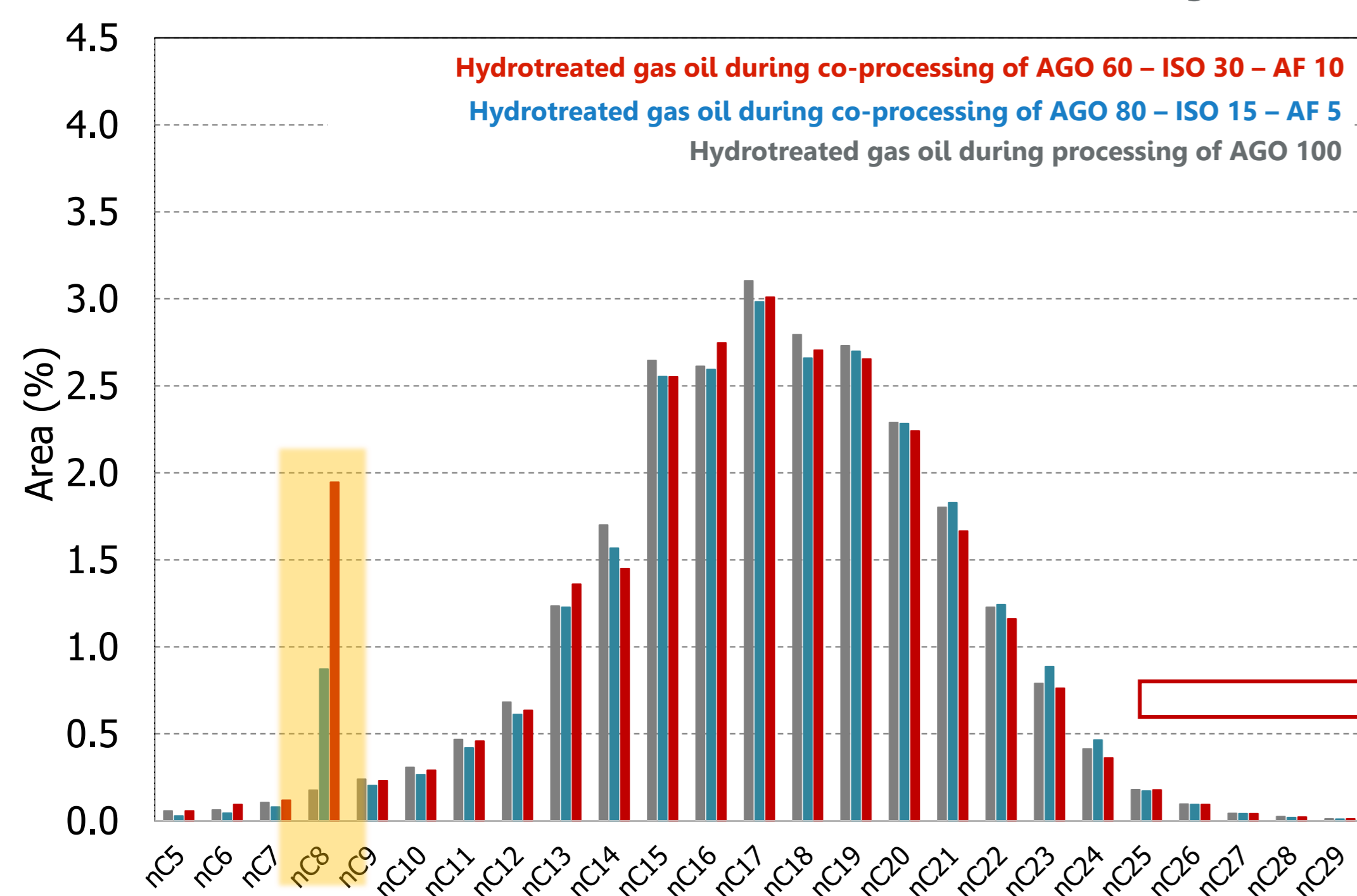


The production of light compounds decreases the density of the hydro-treated gas oil.

Complete conversion of furfural-acetone aldol condensation adducts checked by ATR-IR.

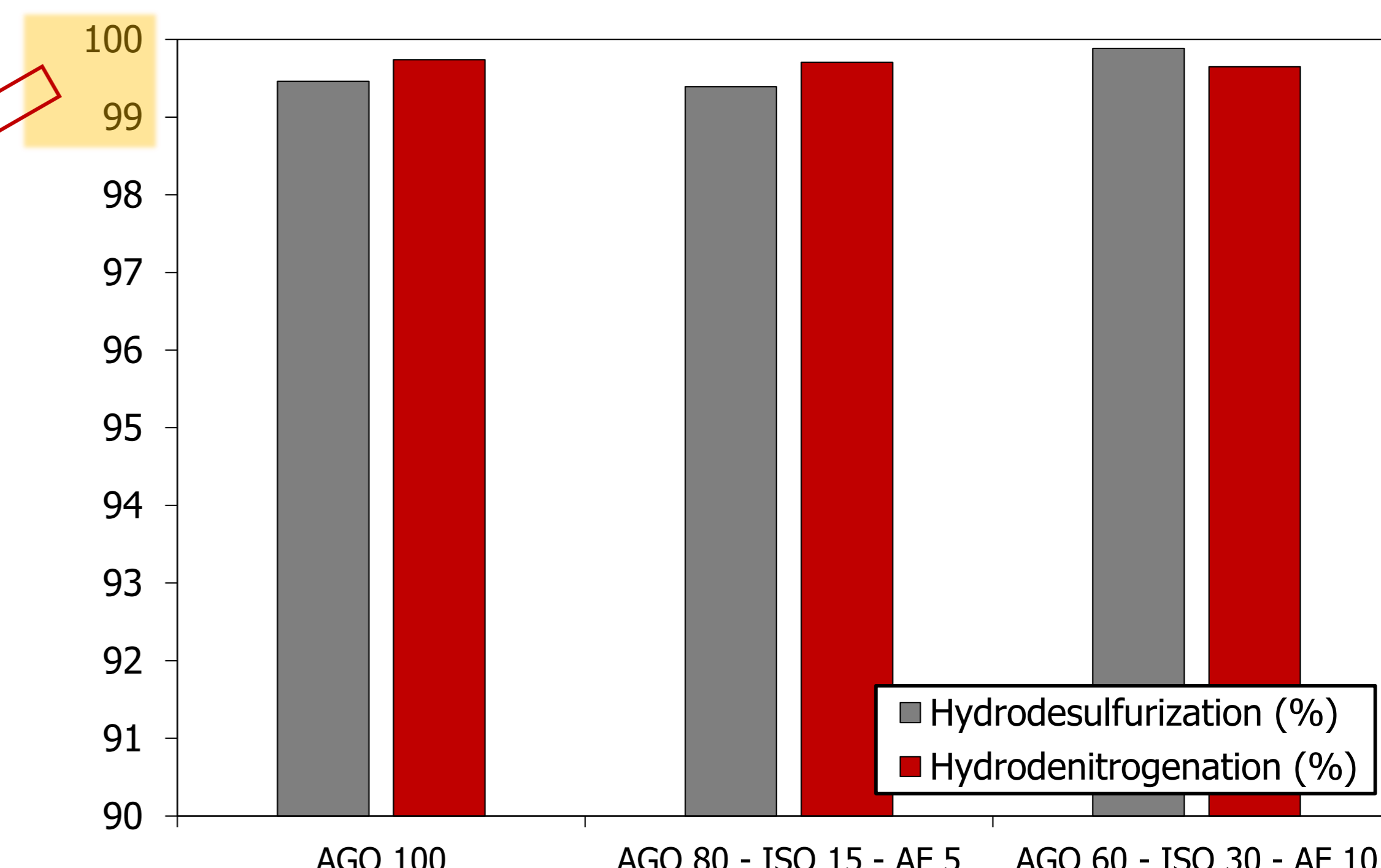


### Products formed and effect on catalyst activity



Co-processing does not significantly affect the catalyst activity, i.e. HDS and HDN efficiencies.

Significant increase of octane content during co-processing of aldol condensation adducts!



## CONCLUSIONS

- ✓ Furfural-acetone Aldol condensation adducts have been successfully co-processed with gasoil and Isopropanol.
- ✓ No significant decrease in catalyst activity (in terms of HDS or HDN efficiencies) was observed during AF adducts co-processing.
- ✓ The addition of AF-adducts results in a significant increase of octane content in the hydro-treated gas oil, affecting some of its properties.

