

# TPU synthesis for automotive instrument panel

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## Abstract

Various method and materials are being applied to the instrument panel to meet the trends of environment friendly, high sensitivity, light weight, and high functionality, and development is proceeding. In this study, it was synthesized by mixing Polyol (PTMG, PEG, etc.) and Isocyanate (MDI, HDI, etc.), and physical properties were changed by changing NCO index. The synthesized TPU was analyzed by FT-IR analysis, mechanical properties were analyzed by UTM, and viscosity was analyzed by viscometer. We will try to synthesize TPU with superior performance by different kinds of isocyanate and chain extender.

## Objective

1. Blending Polyol and Isocyanate contents to make a TPU
2. Viscosity comparison according to TPU synthesis time
3. Evaluation the physical properties and comparisons according to NCO index

Blending of Polyol with Isocyanate

NCO index of high mechanical properties

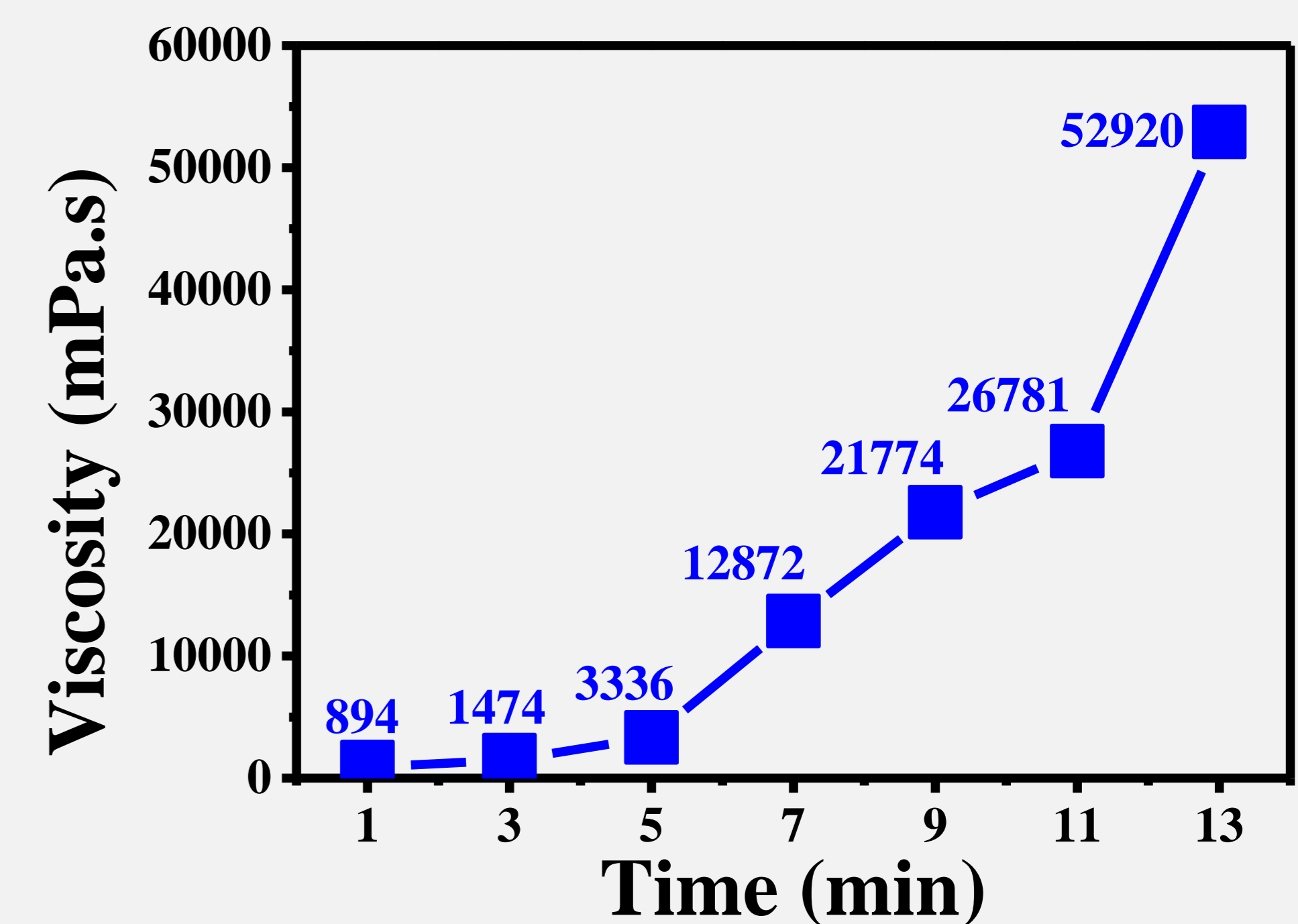
Comparison of properties after trial addition polymerization

Future additives, reinforcing agents and plasticizer combinations

## Results

### VISCOSITY

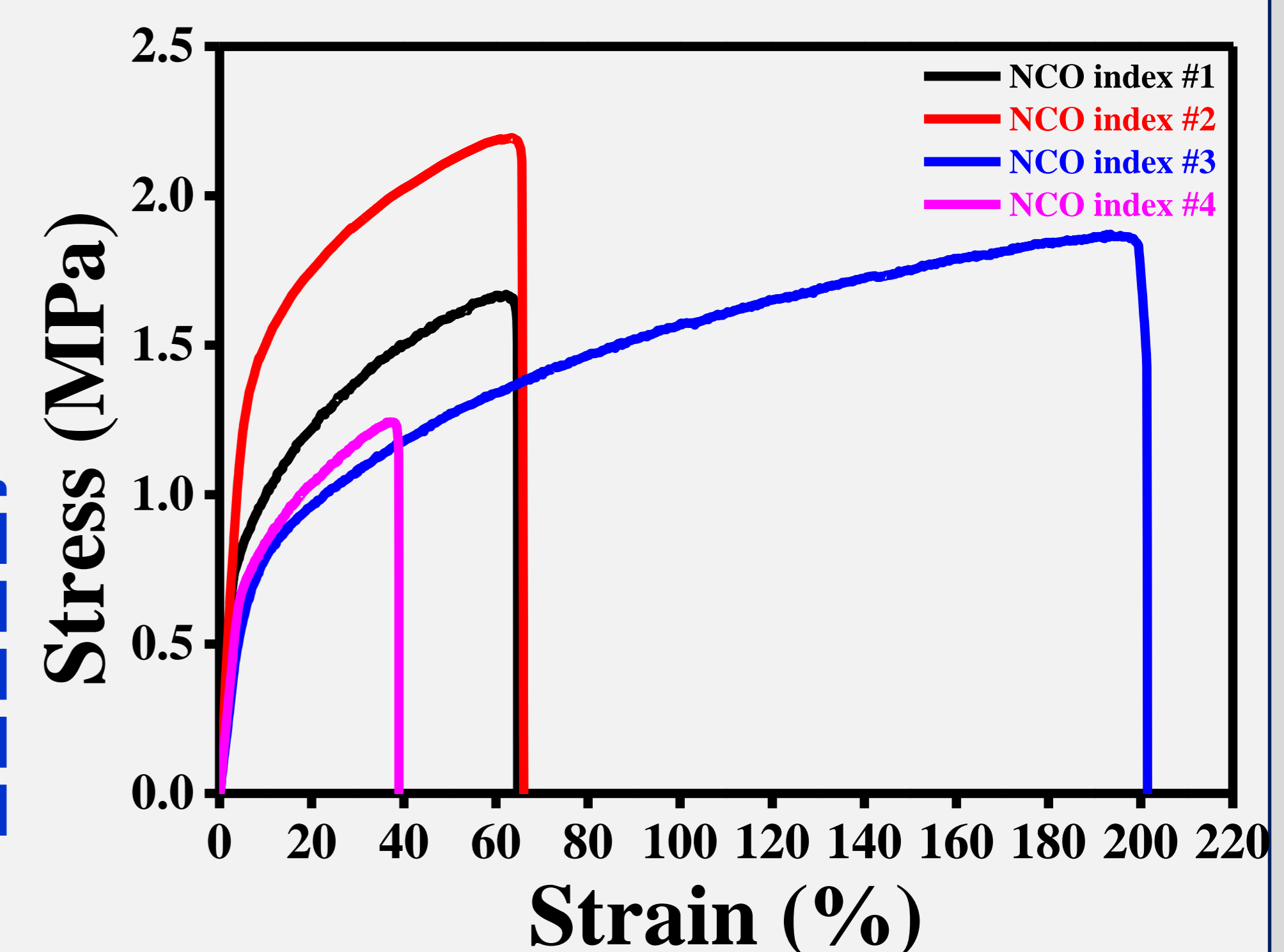
CONDITION	
SHEAR RATE	50s <sup>-1</sup>
DURATION	60sec



### SAMPLE

가공 (숙성)	Film 건조	시료 제작	평가
60°C (24hr)			Not measurable
60°C (24hr) → 140°C (4hr)			

### UTM



### Measures

	Young's Modulus (MPa)	Maximum Stress (MPa)	Percent Strain (%)
#1	0.0268	1.6699	62.2163
#2	0.0346	2.1943	63.4790
#3	0.0097	1.8713	192.7049
#4	0.0335	1.2432	37.1246

## Conclusion

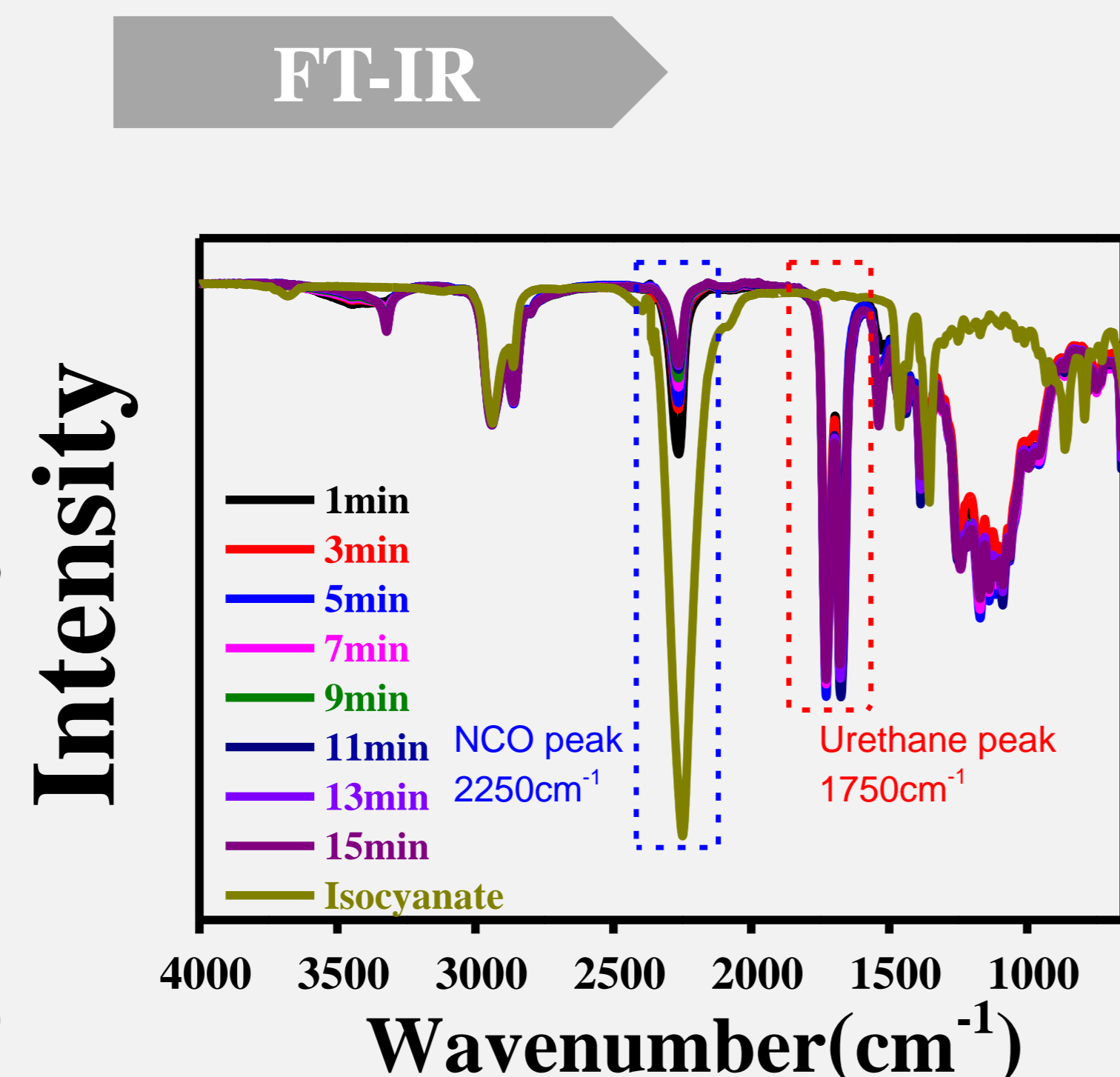
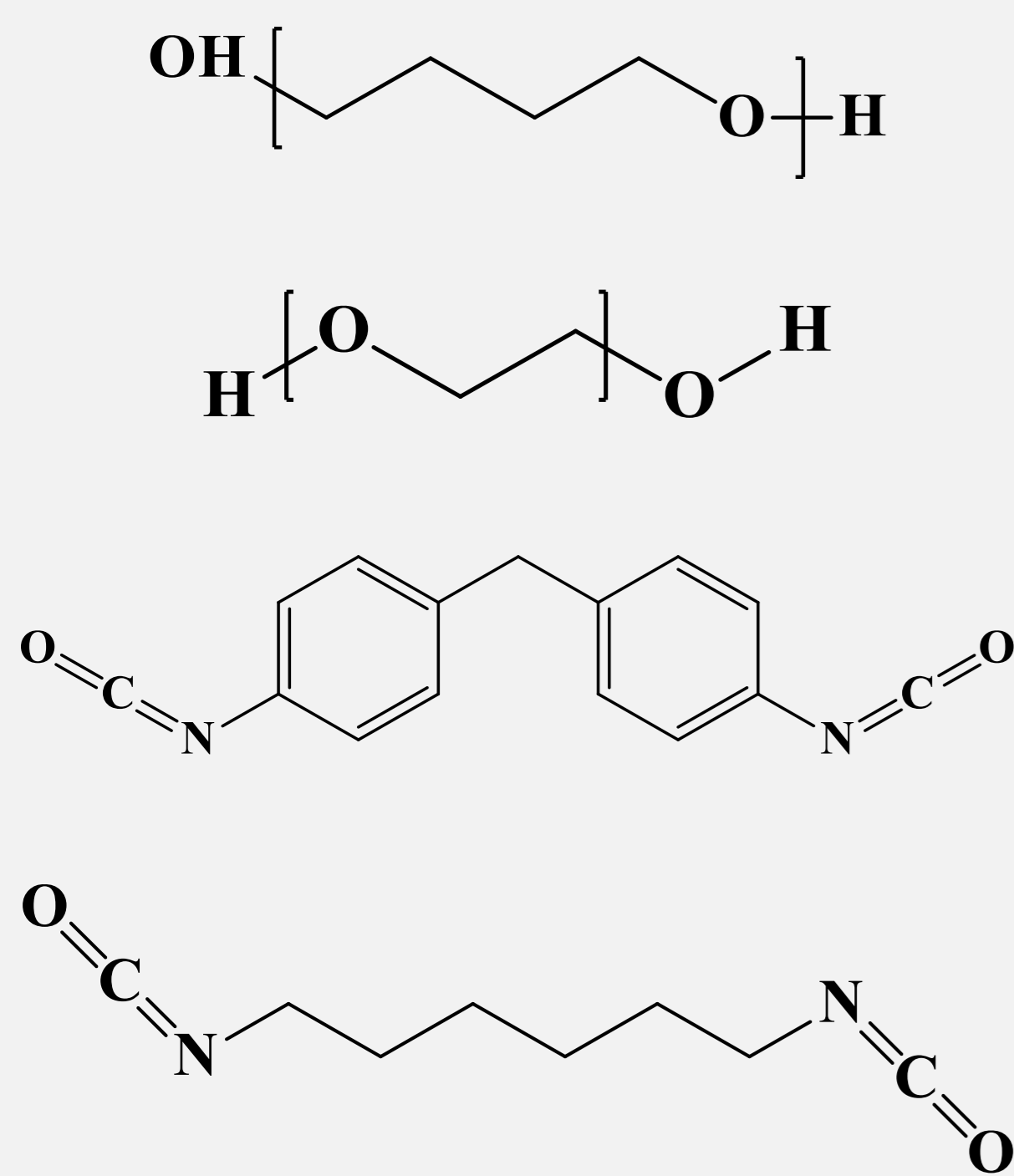
- Successful instrument panel TPU synthesis
- Structural analysis and viscosity measurement of synthesized TPU
- Check the change of mechanical properties according to the change of NCO index (Excellent mechanical properties of NCO index #3)

## Experimental

Polyol (PTMG, PEG, etc)  
Isocyanate (MDI, HDI, etc)  
Chain extender (EG, BD, etc)



Please note that it is difficult to provide materials and synthesis schemes as the experiment is proceeding.



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