

Hydroprocessing Heterogeneous Catalysts for Aviation Grade Green Diesel: Preparation & Characterization

Chih-Chieh Chen, Chung-Hung Hsieh* E-mail: japimodi@gms.tku.edu.tw

Department of Chemistry, Tamkang University, Tamsui, New Taipei City, Taiwan

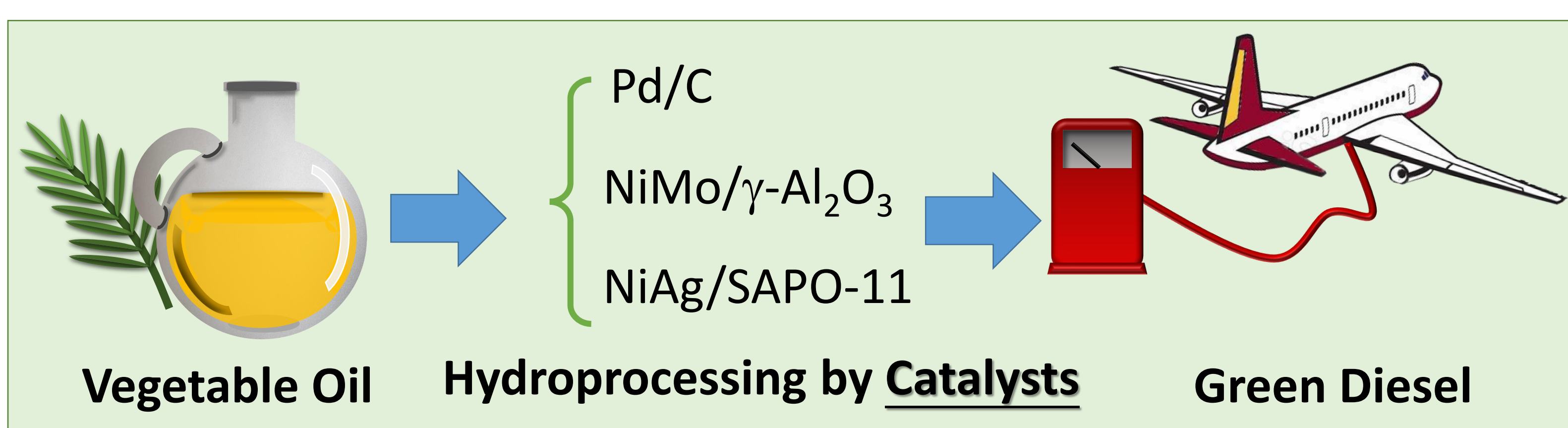


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Abstract:

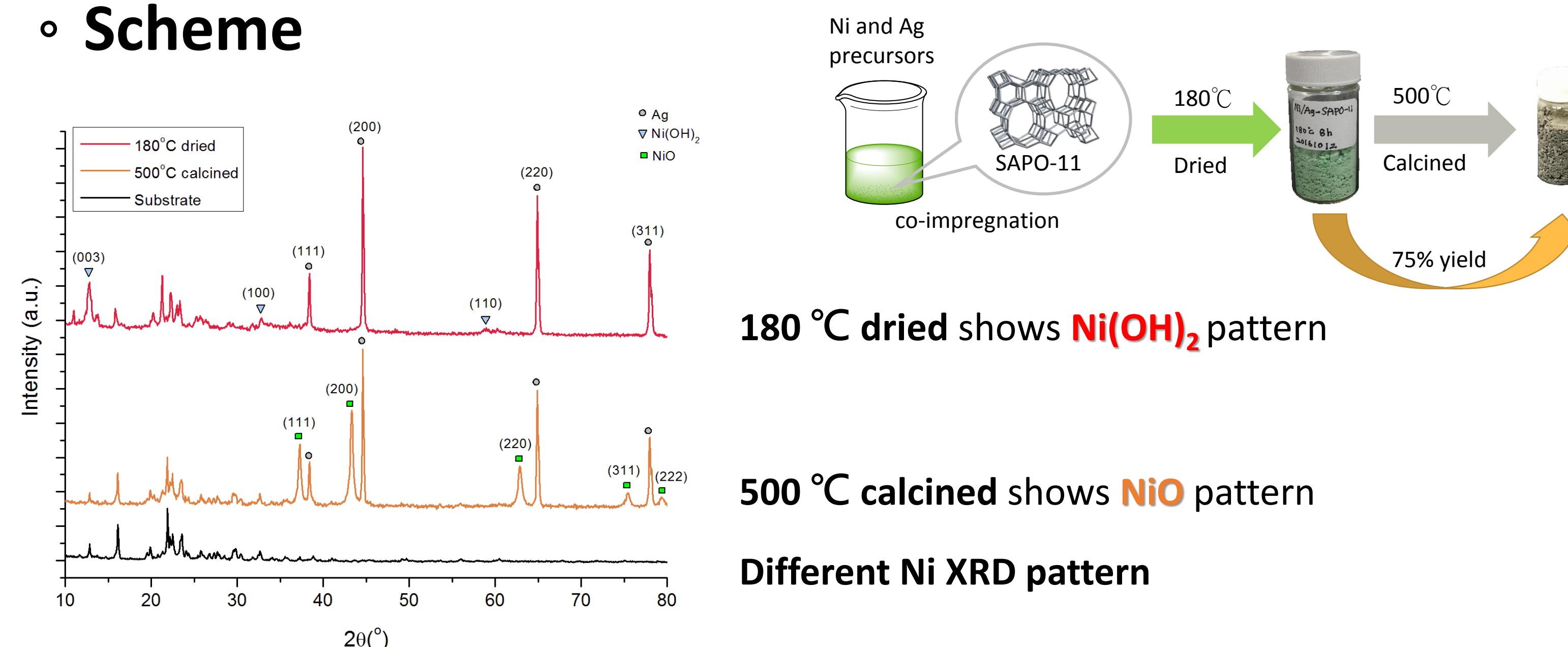
Green diesel is mostly produced by a process to transform vegetable oil into biofuel through hydrocracking and hydrogenation. For the aviation grade biofuel, several requirements are needed, such as low freezing point and low viscosity, etc.

The catalysts we study on are NiMo/ γ -Al₂O₃^{2,3}, Pd/C, and NiAg/SAPO-11^{1,4,5} respectively. The fresh and spent catalysts were characterized by FT-IR, powder X-ray diffraction (XRD) and Scanning Electron Microscope (SEM) to understand the change of the catalyst after hydroprocessing. The NiAg/SAPO-11 catalyst for hydrocracking and hydroisomerization is prepared by two different temperature subsequently after co-impregnation. From XRD patterns of fresh NiAg/SAPO-11 catalysts, we found that nickel presents in different forms. One is Ni(OH)₂ the other is NiO. We infer the reason that made NiAg/SAPO-11 invalid after catalyzed might be the leaching of nickel and the alkane remaining on the catalyst. Consider of that, we found a possibility of regeneration by reimpregnation after calcined the spent catalyst.



.Preparation of NiAg/SAPO-11 Catalyst:

◦ Scheme

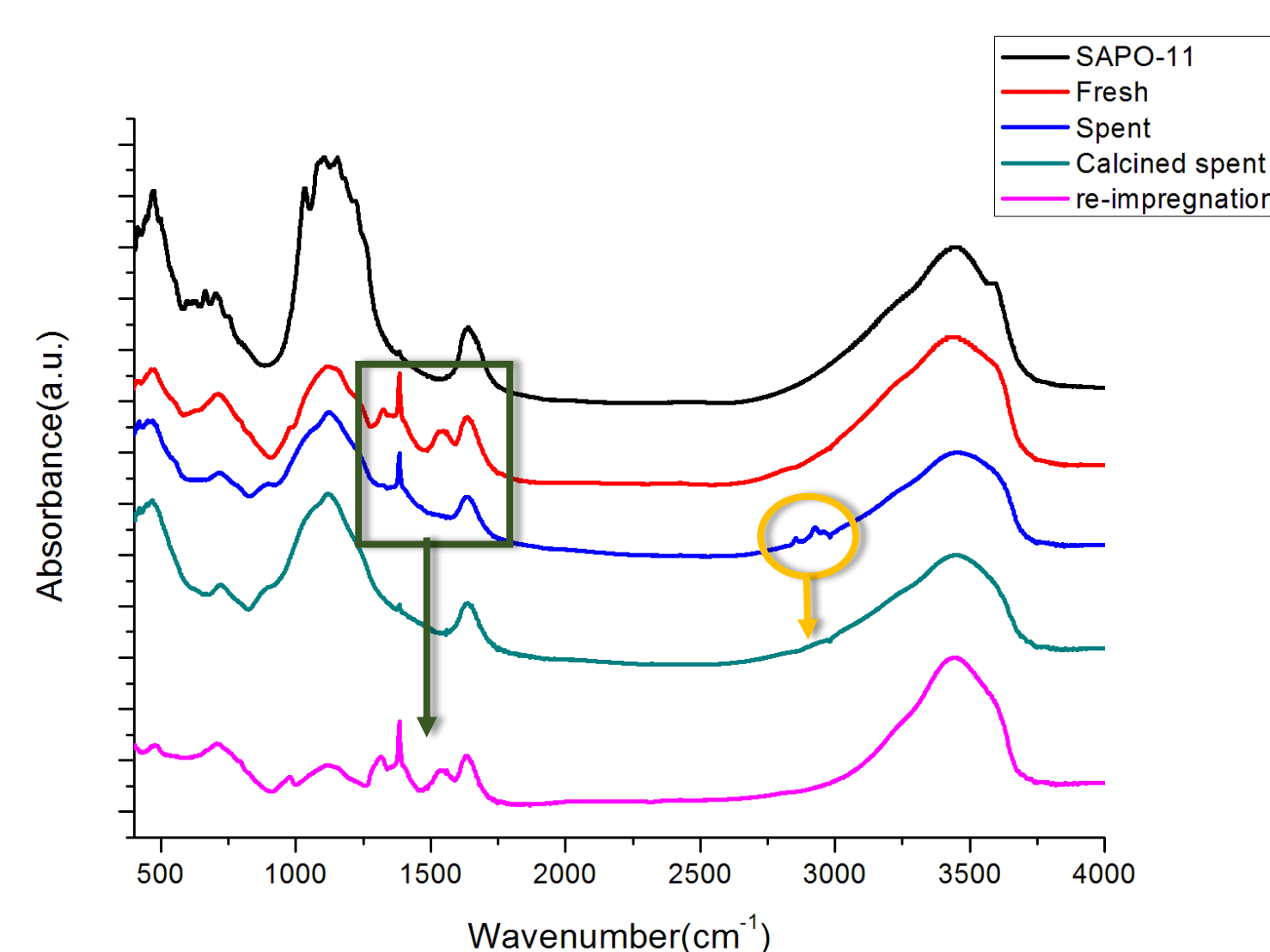


→ 180 °C dried NiAg/SAPO-11 was chosen for the catalyze experiments

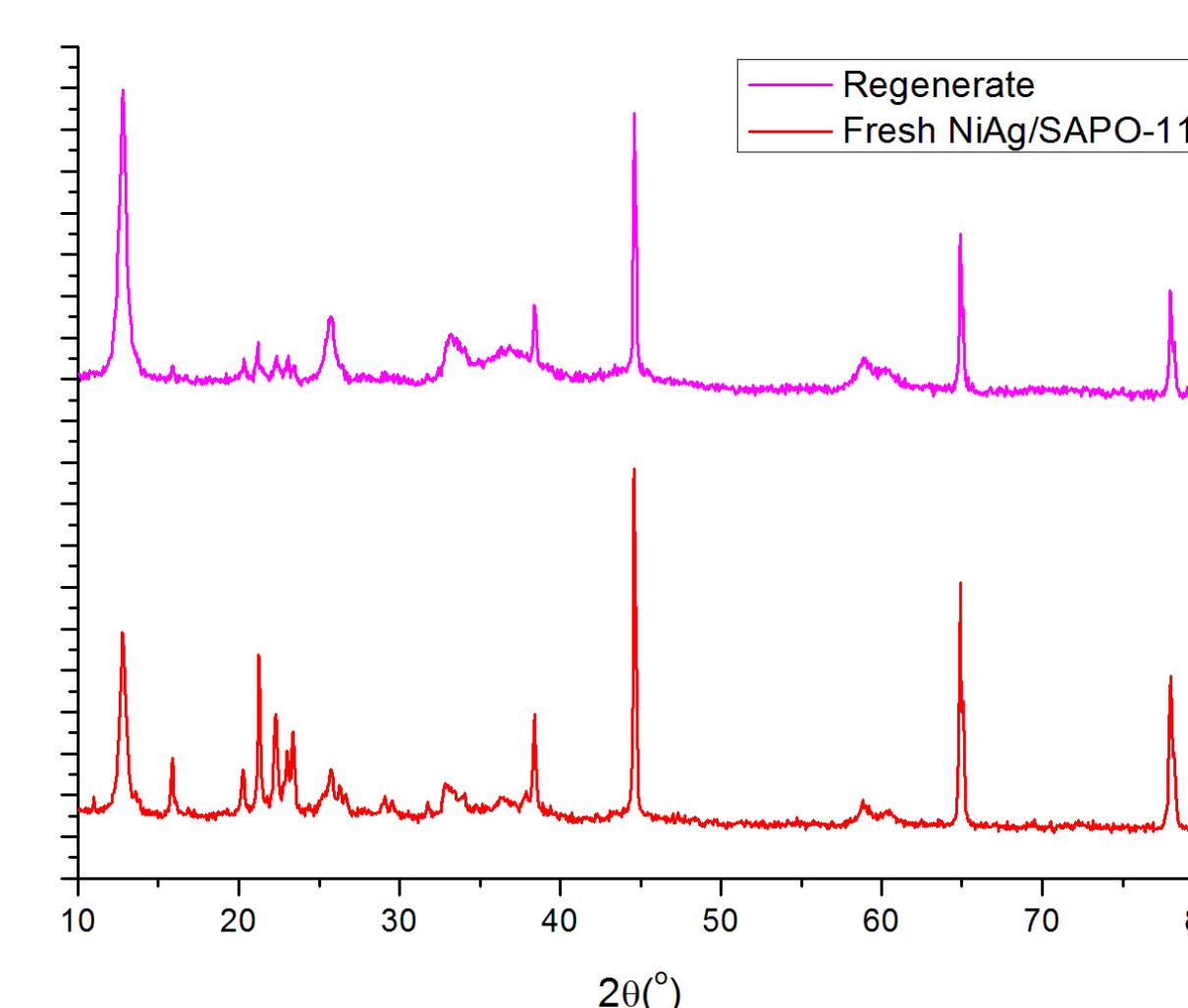
.Regenerate the Catalysts:

◦ NiAg/SAPO-11

1. **Calcine**: burn the impurity off
2. **Reimpregnation**: reload the Ni



almost identical pattern



◦ NiMo/γ-Al₂O₃

The color has changed after calcined

Spent catalyst

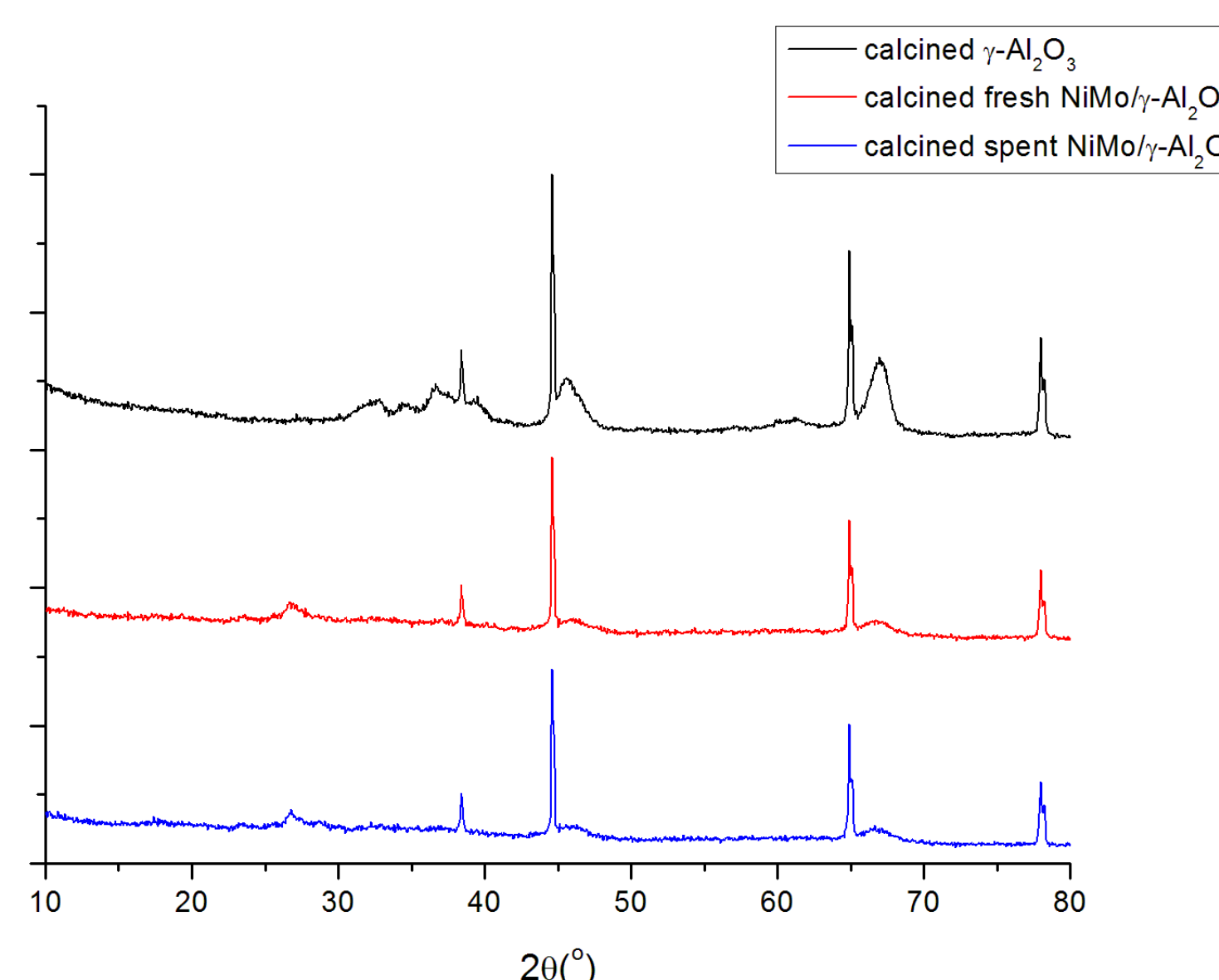


Black

Fresh catalyst



apple green



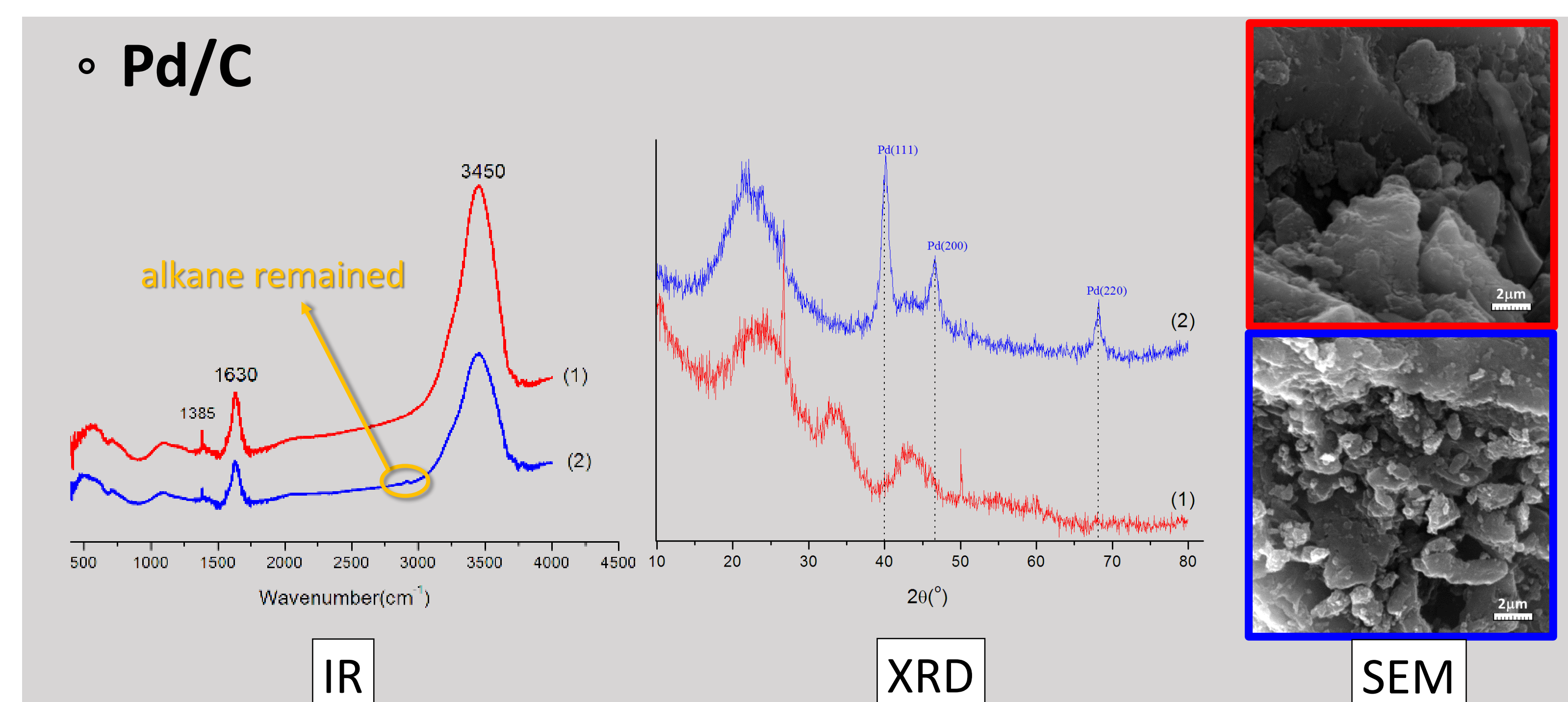
Al pattern become sharp !

Miller indices	d(Å)	2θ (°)
(111)	2.34	38.4
(200)	2.03	44.6
(220)	1.43	64.9
(311)	1.22	78.0

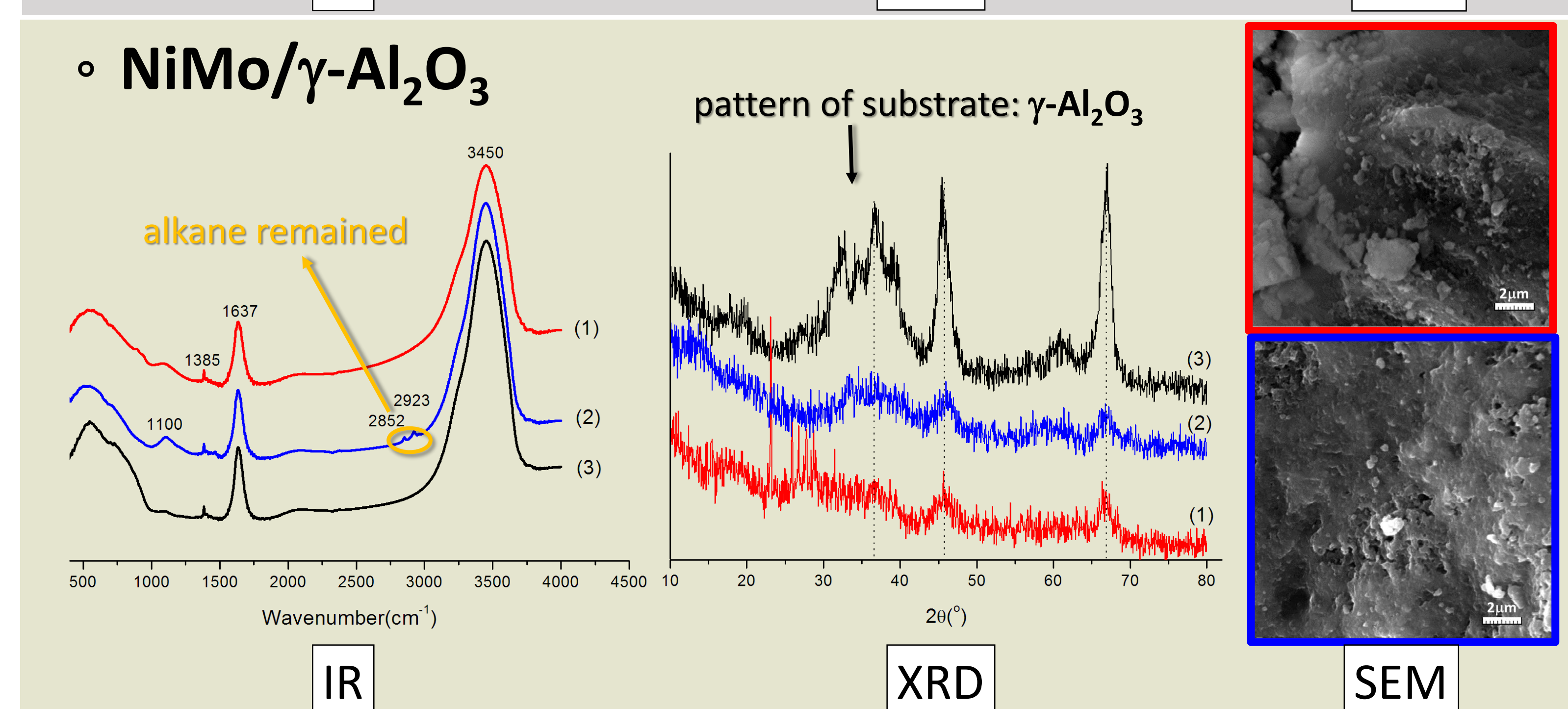
.Catalysts after Hydroprocessing:

Before and After catalyze

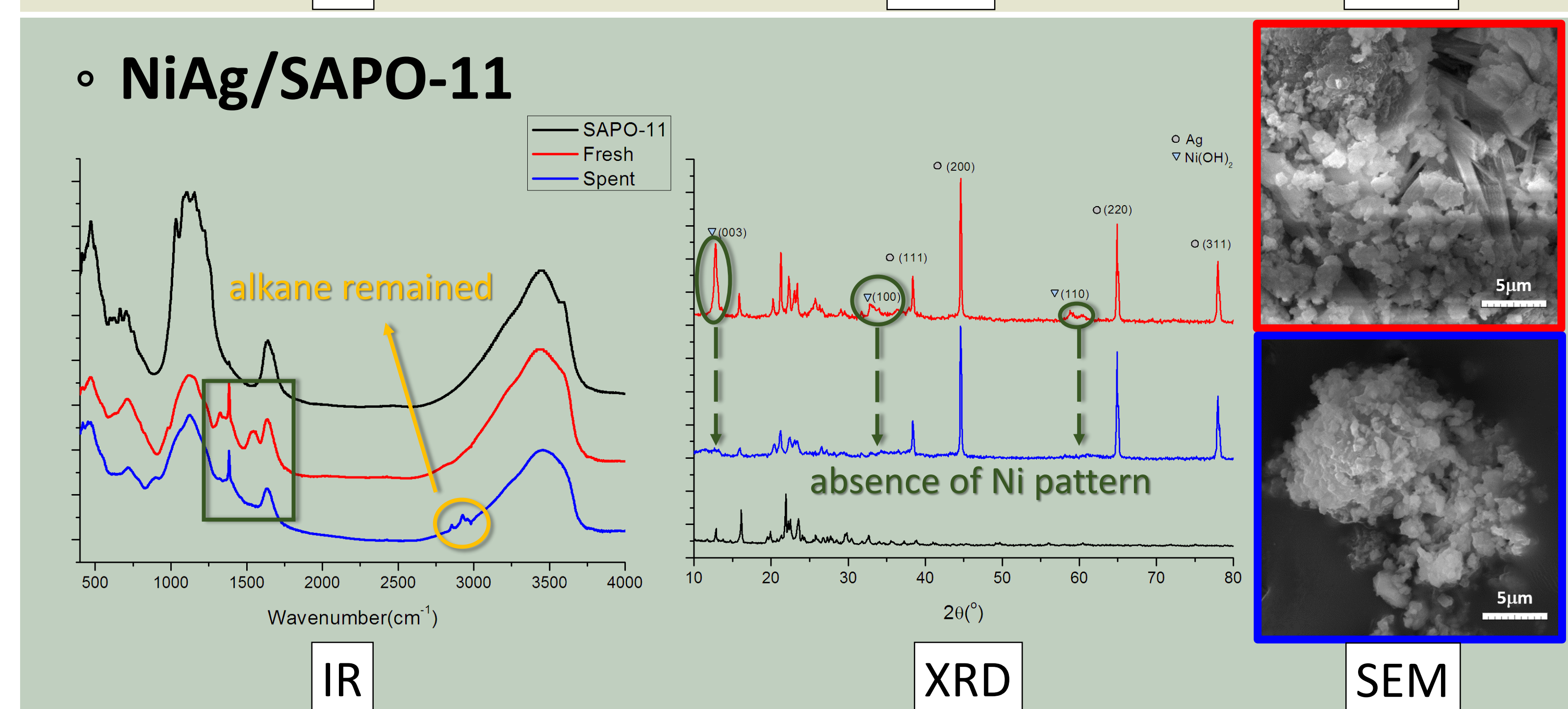
◦ Pd/C



◦ NiMo/γ-Al₂O₃



◦ NiAg/SAPO-11



Reference

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