



***INFLUENCE OF PATP ON THE
PROPERTIES OF SOME FOOD PACKAGING
MATERIALS***

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The aim of this research was to investigate the influence of combined pressure-heat treatment (PATP) on mechanical and thermal behaviour of different packaging materials.

OBJECTIVES

- Testing of the mechanical behavior of multilayer polymer films PATP treated
- Identify the macro and microstructural changes of multilayer polymer films PATP treated
- Characterization of thermal behavior of multilayer polymer films PATP treated



PATP PACKAGING FILMS

5PAO/EVE 60

PAO // PE / EVOH / PE

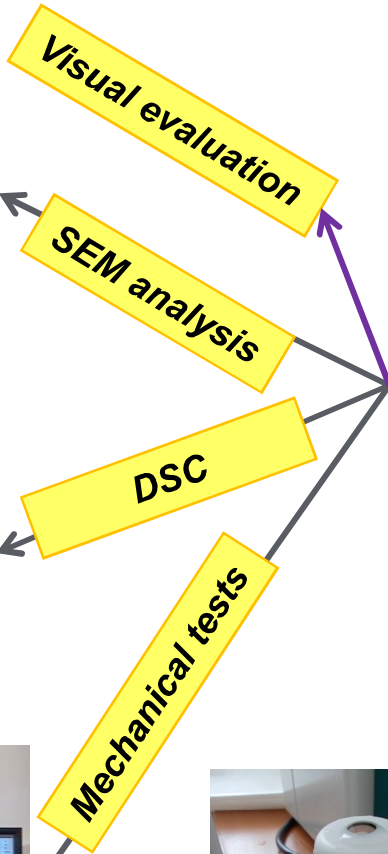
GVA 70

PA //EVOH / PA / PE

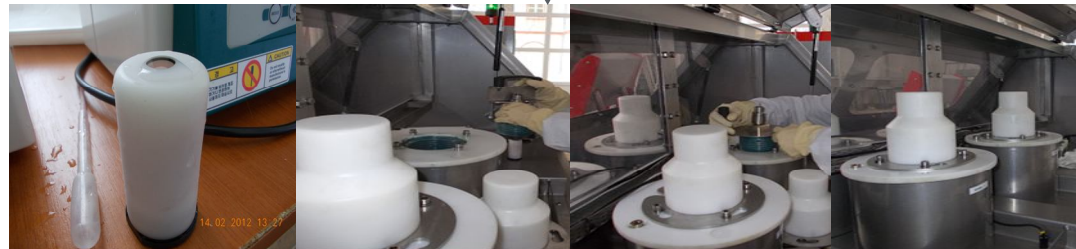
GVA 150

- ✓ **flexible;**
- ✓ **structural integrity;**
- ✓ **the aesthetic qualities should not be compromised;**
- ✓ **product protection;**
- ✓ **providing isolation from external factors.**

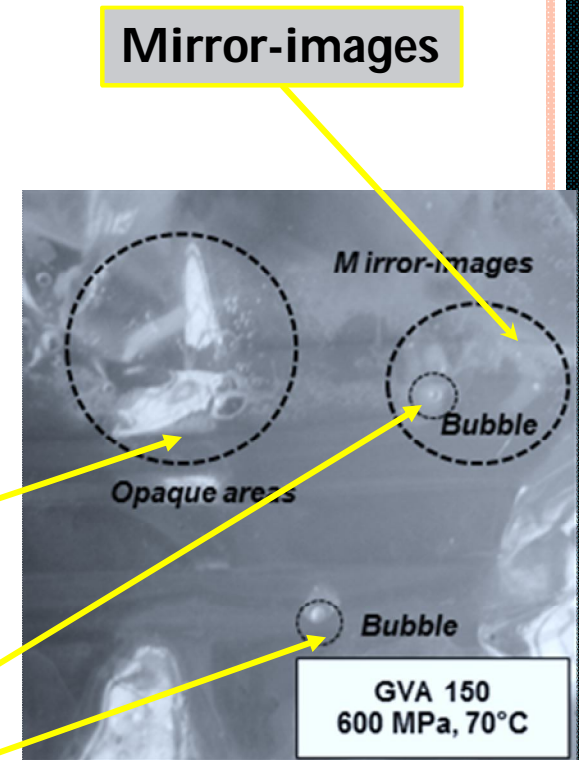
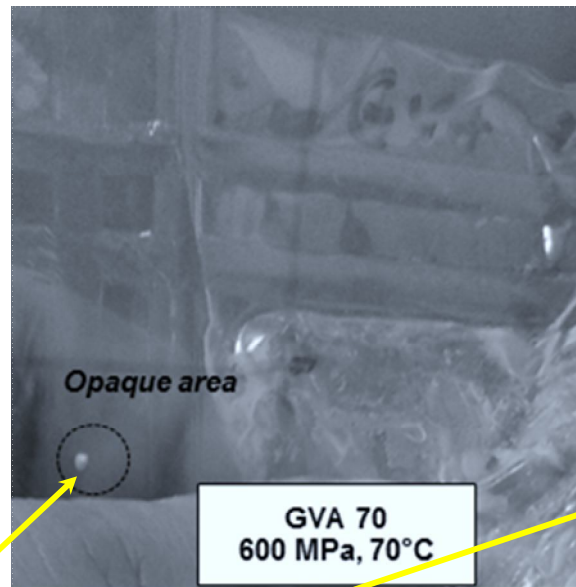
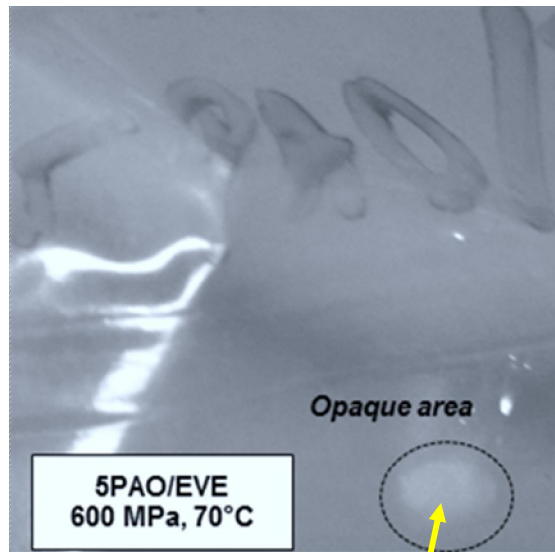




PATP



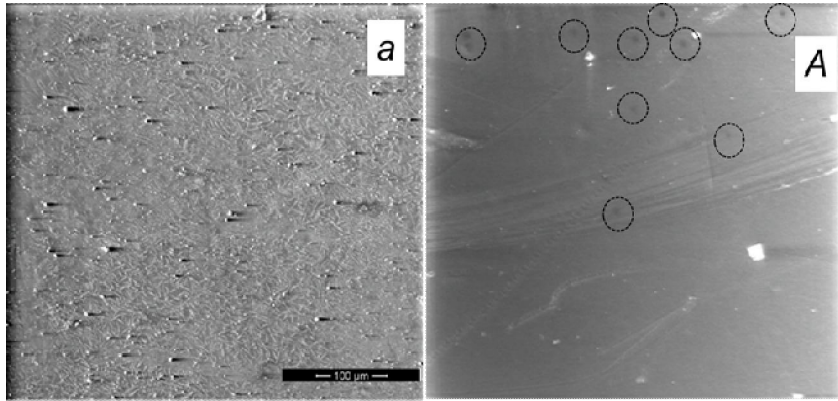
VISUAL EVALUATION POST PATP



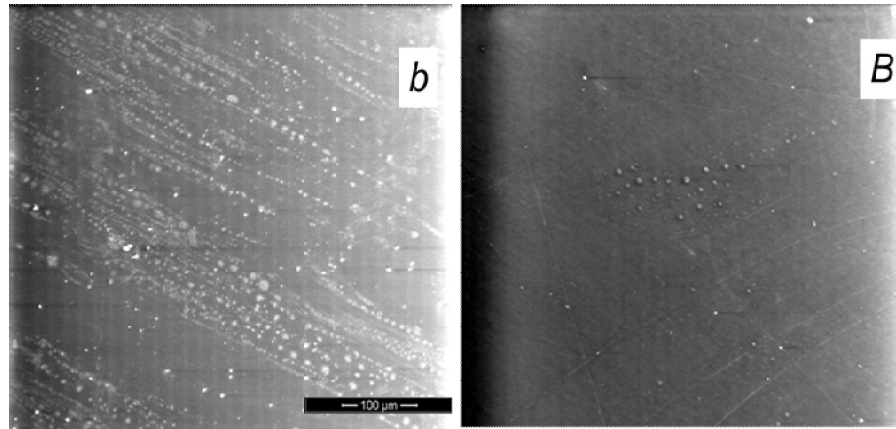
Opaque areas

Bubbles

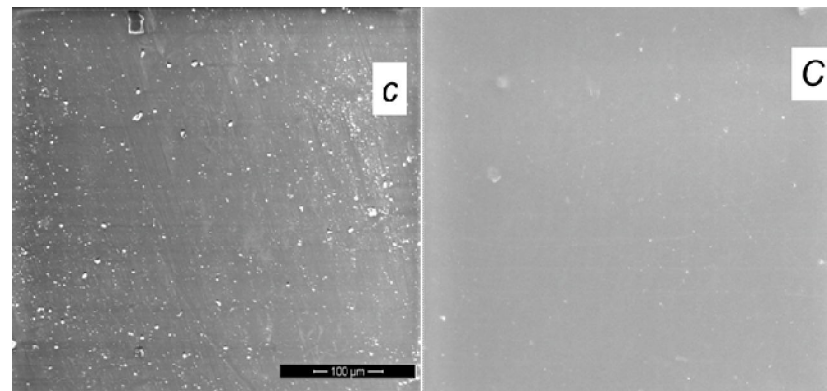




5PAO/EVE 60



GVA 70

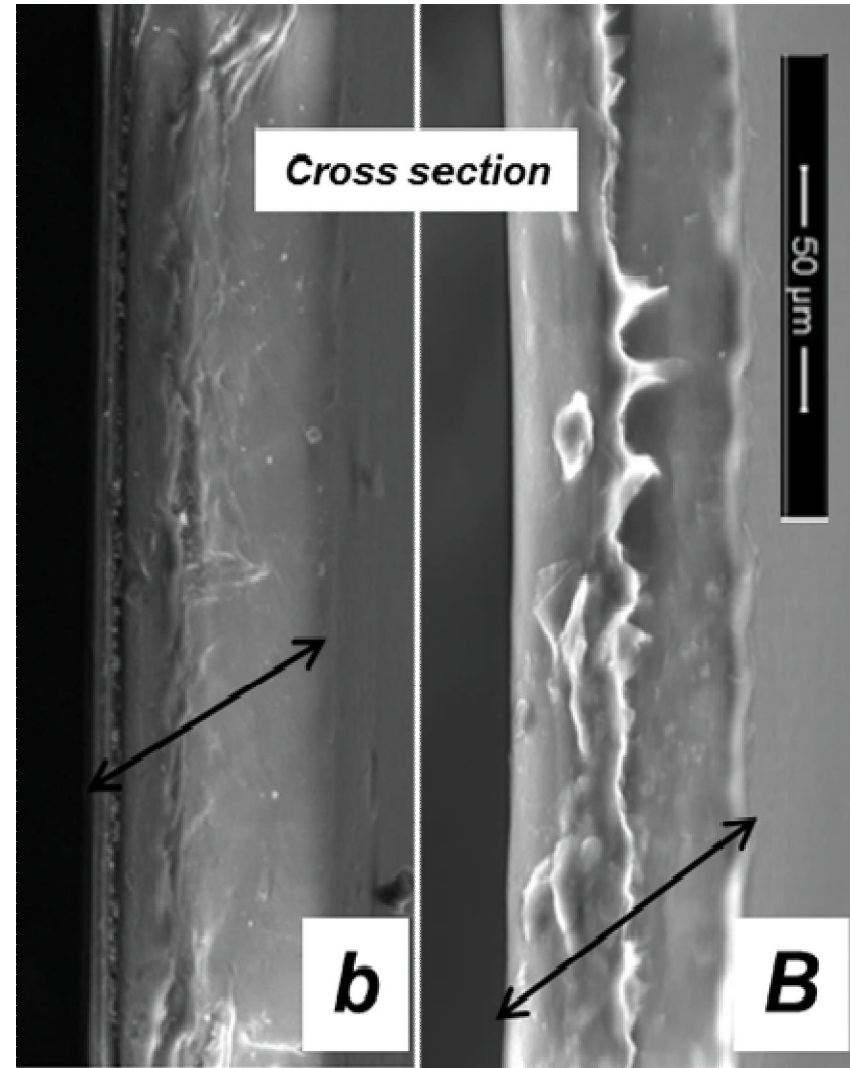
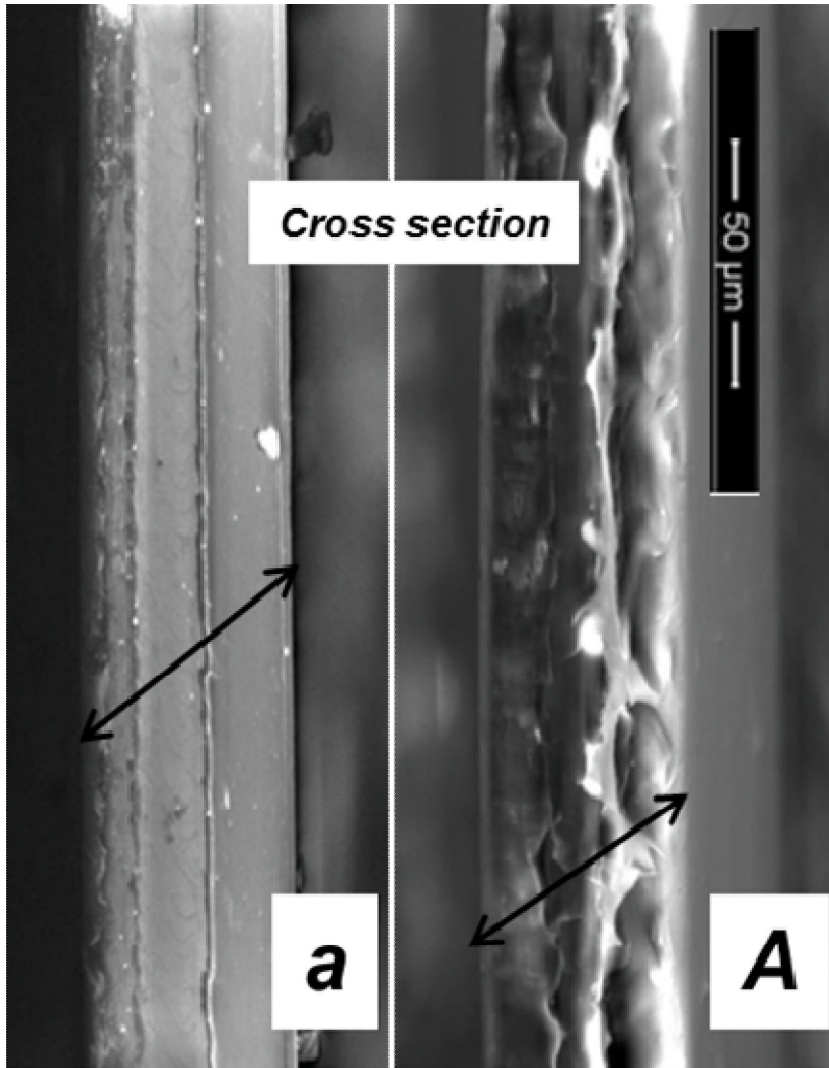


GVA 150

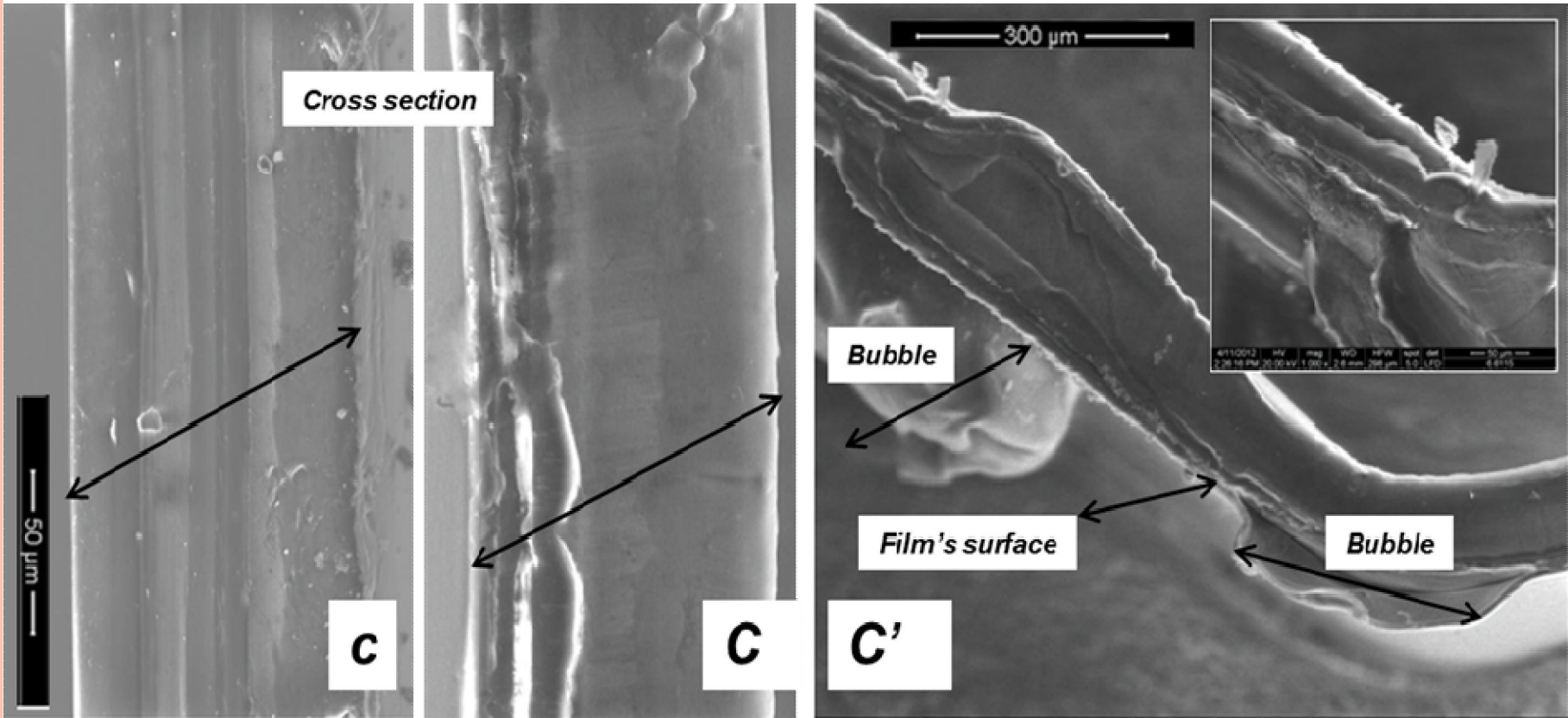


5PA0/EVE

GVA 70



GVA 150



TENSILE STRENGTH (MPa) OF THE ANALYZED FILMS

Packaging material	Control	600 MPa, 20°C	600 MPa, 70°C
5PAO/EVE	74.94±3.05	64.19±1.91	61.61±2.23
GVA 70	27.22±1.01	27.99±1.08	28.83±1.31
GVA 150	24.16±1.05	24.94±0.46	27.51±0.67



THE PERCENT ELONGATION AT BREAK (%) OF THE ANALYZED FILMS

Packaging material	Control	600 MPa, 20°C	600 MPa, 70°C
5PAO/EVE	41.55±0.35	35.61±0.52	35.56±1.30
GVA 70	36.61±0.77	35.86±0.57	36.31±0.39
GVA 150	36.48±0.31	36.24±0.57	35.55±0.30

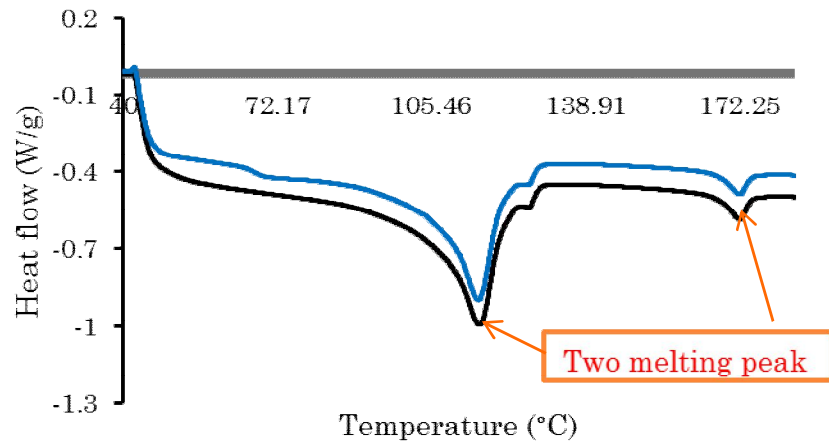


YOUNG'S MODULUS (MPa) OF THE ANALYZED FILMS

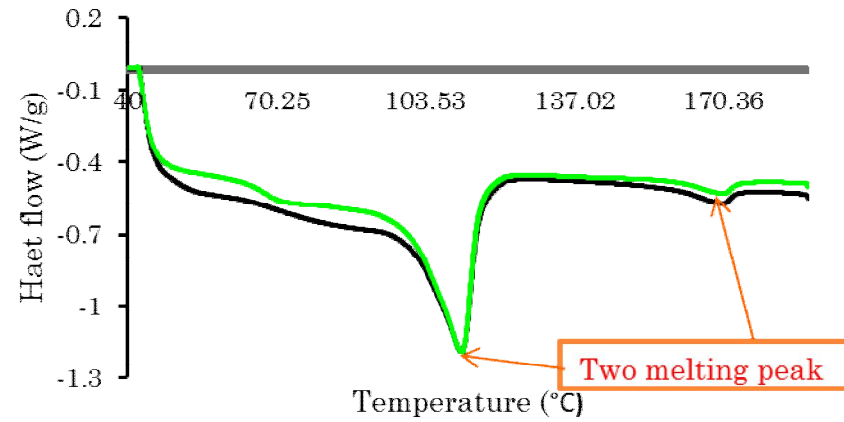
Packaging material	Control	600 MPa, 20°C	600 MPa, 70°C
5PAO/EVE	849.15±38.40	842.68±10.88	720.96±19.74
GVA 70	564.46±17.29	398.84±16.87	449.47±32.45
GVA 150	442.20±10.53	167.97±14.80	n.d.



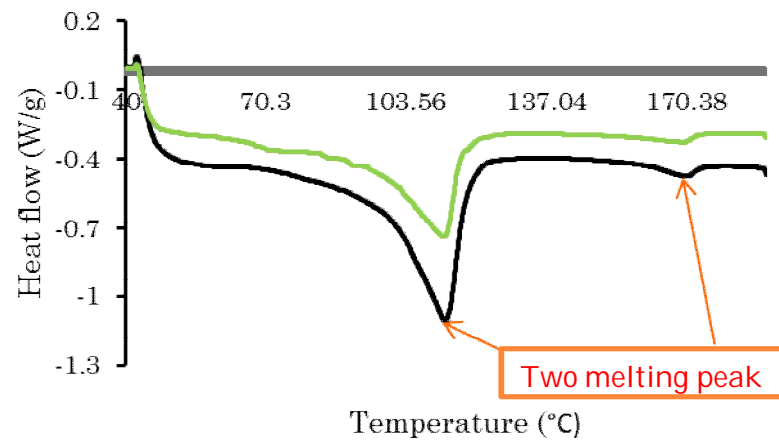
THERMAL PROPERTIES



— PAO EVE 60 (control) — PAO EVE 60 (PATP processed)



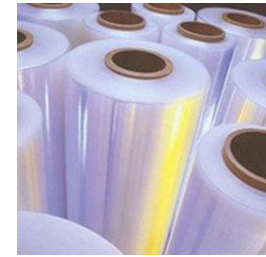
— GVA 70 (control) — GVA 70 (PATP processed)



— GVA 150 (control) — GVA 150 (PATP processed)



CONCLUSIONS



- The PATP treatment alters the mechanical of selected multilayer structures (do not exceed 14-18% of their starting value)
- In some cases, combined pressure-heat treatment promotes changes in thermal properties packaging materials
- Opaque areas and bubbles were a general consequence of the high-pressure processing of multilayer polymeric films
- The PATP treatment can compromise the structural integrity of food packaging films (delamination phenomena)
- High pressure induces changes in intra- and intermolecular interaction of packaging film





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Thank you for your attention!



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