

The influence of radiation dose in composites of HDPE-silica films onto mechanical properties

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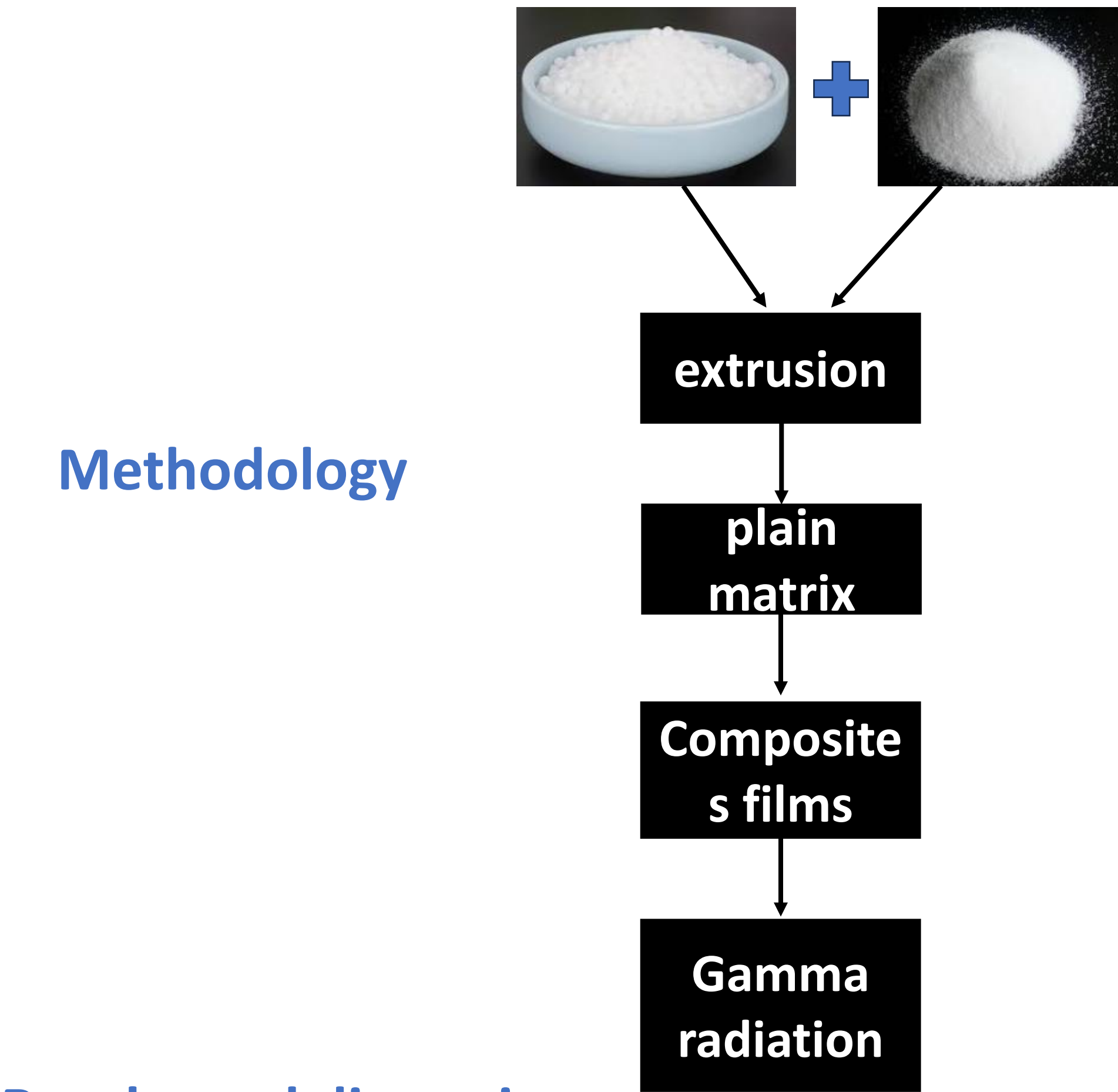
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Introduction

Some applications of high density polyethylene are due to its crystalline structure that is more dense than the other types of polyethylene, besides other advantages, like nontoxic, recyclable, chemical and mechanical resistance, and withstand high temperature and aggressive environment. This polymer is also known for the tendency to crosslinking when submitted to radiation.

Objective

The objective of this work is to verify the influence of different quantities of silica in HDPE when these composites are submitted to gamma radiation, regarding mechanical and chemical resistance.

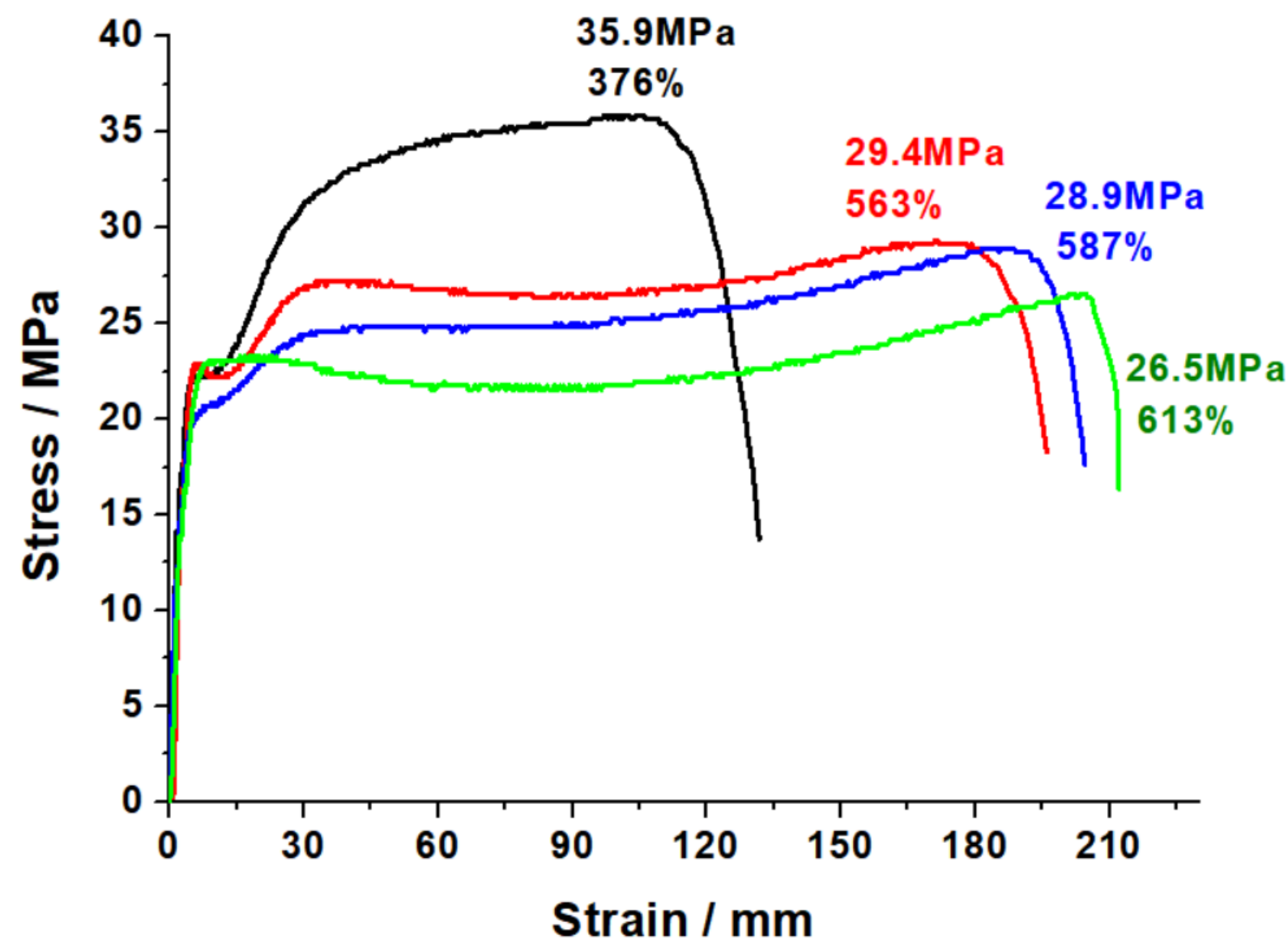
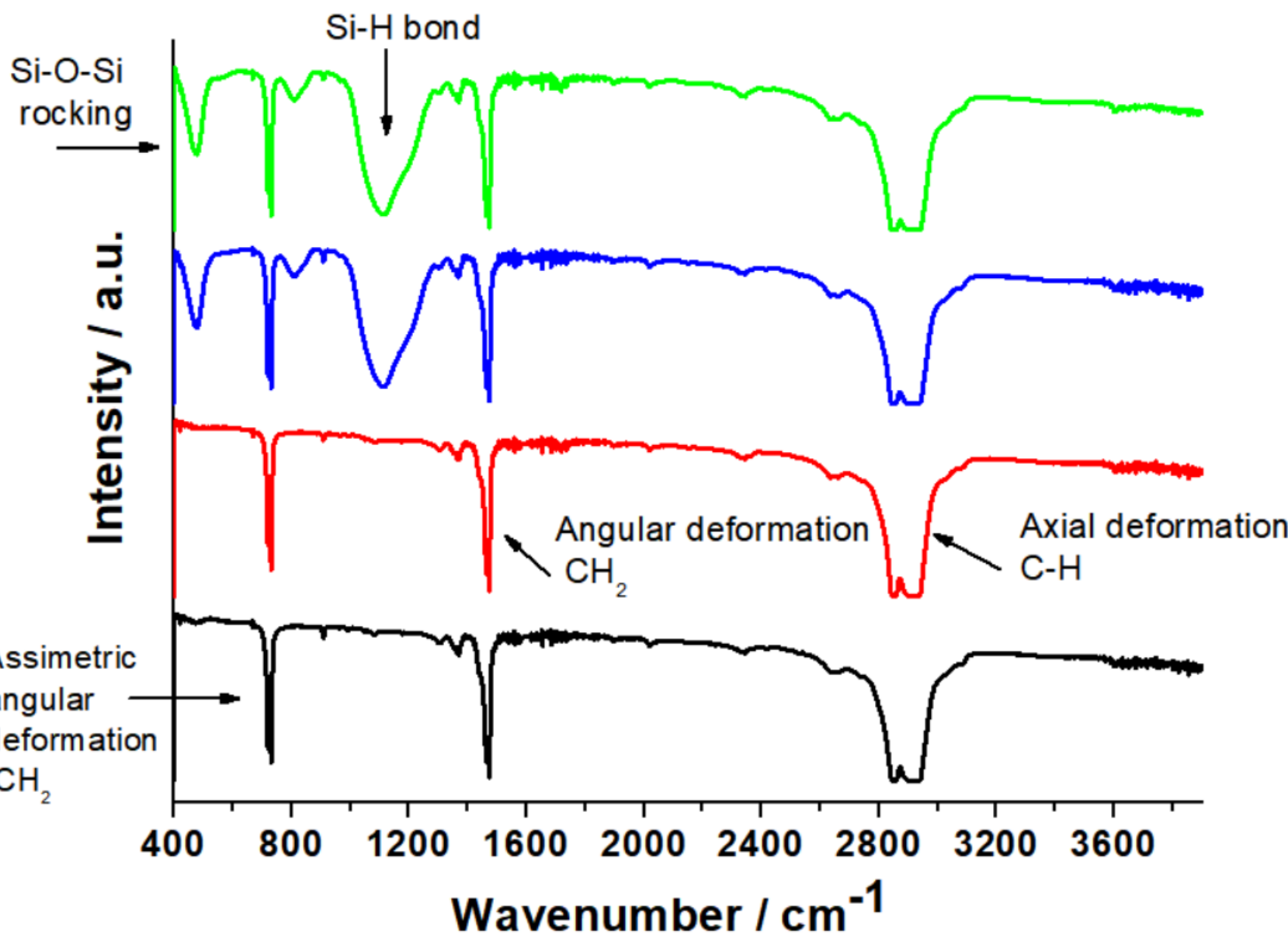
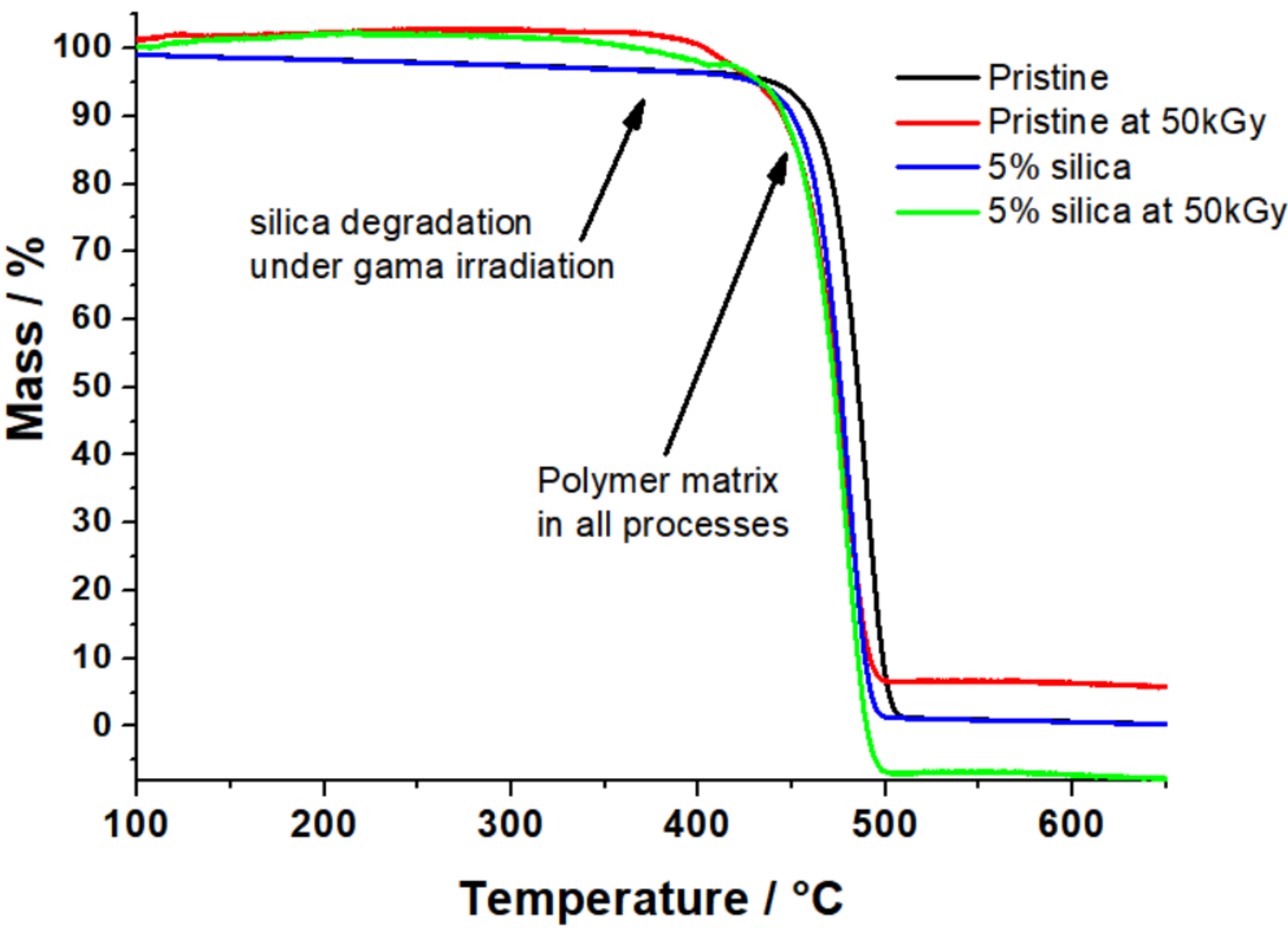


Results and discussion

Table 1 – Results of x-ray fluorescence

Material	Detect quantity / %
5% silica	4.4
10% silica	8.0
15% silica	13.0

The influence of sílica and the radiation in the developed films are demonstrated in this work using the films with 5% of sílica and at 50kGy dose irradiated.



Conclusions

- Incorporation of silica was demonstrated by x-ray fluorescence and FTIR
- The effect of irradiation was observed by TGA and mechanical tests which present a decrease in all irradiated samples (at 30kGy and 50kGy) and with the increase of silica quantity (5, 10 and 15%) regarding strain values.
- Thermal analysis didn't reveal drastic changes in the stability.

Acknowledgment

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