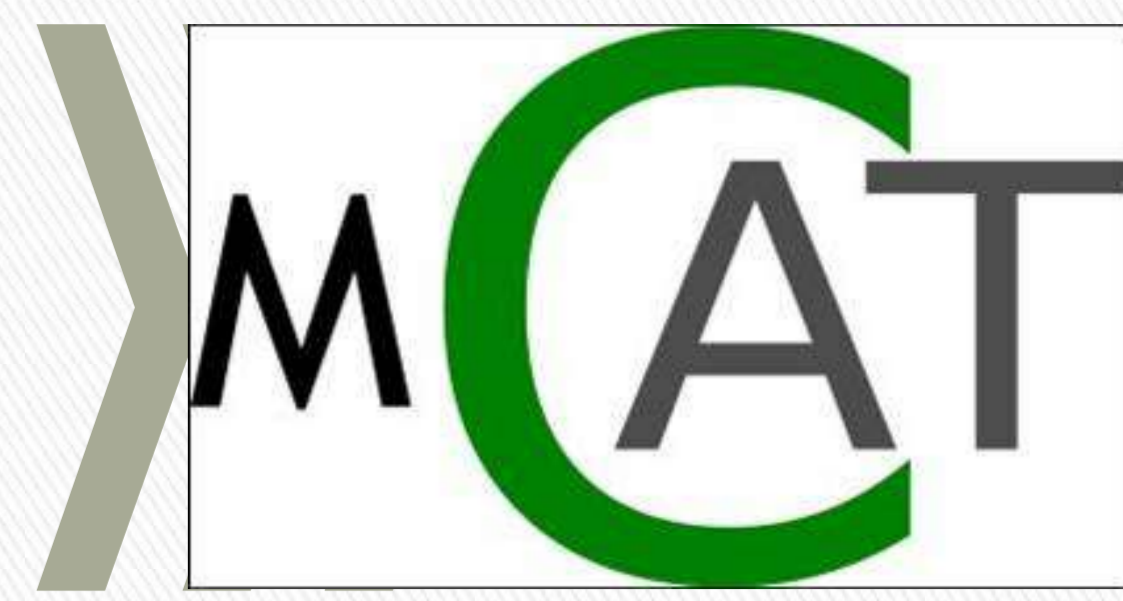


Formation of carbon nanofibers under moderate synthesis of carbon gels

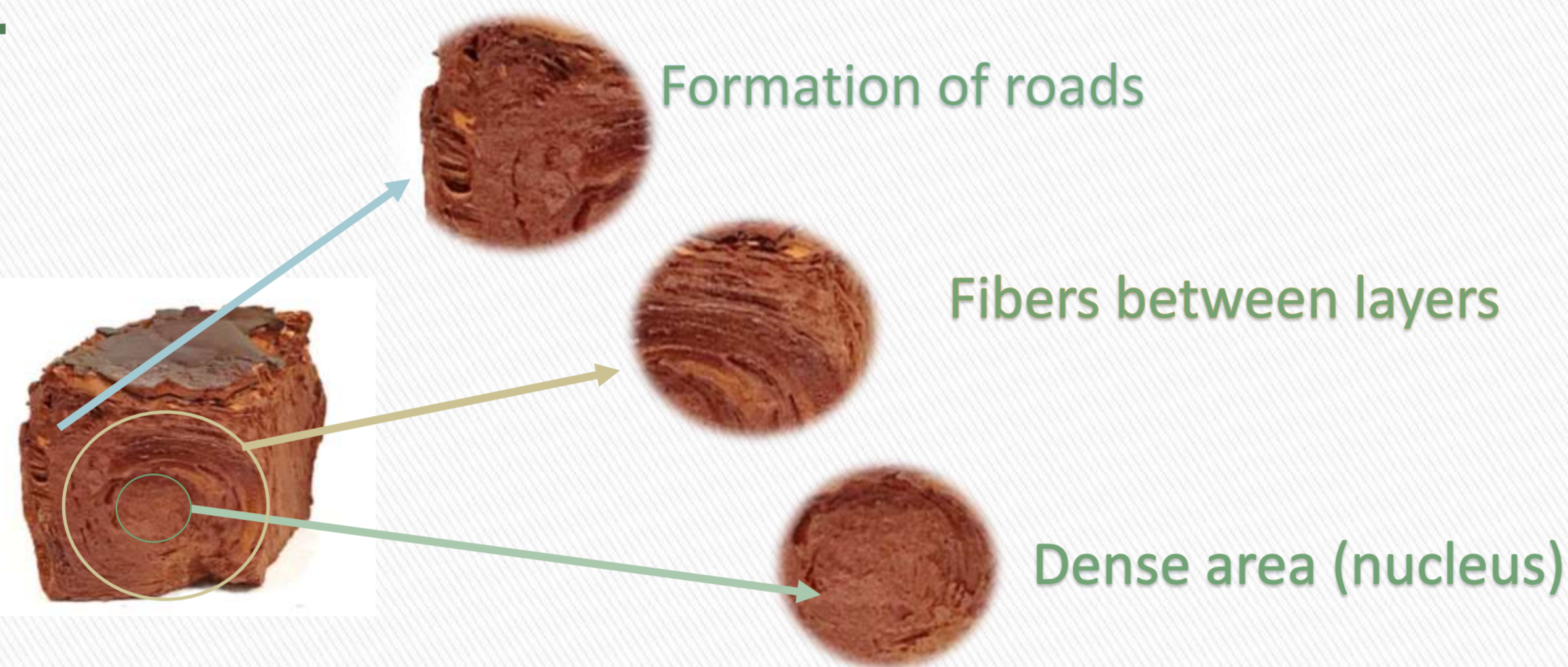


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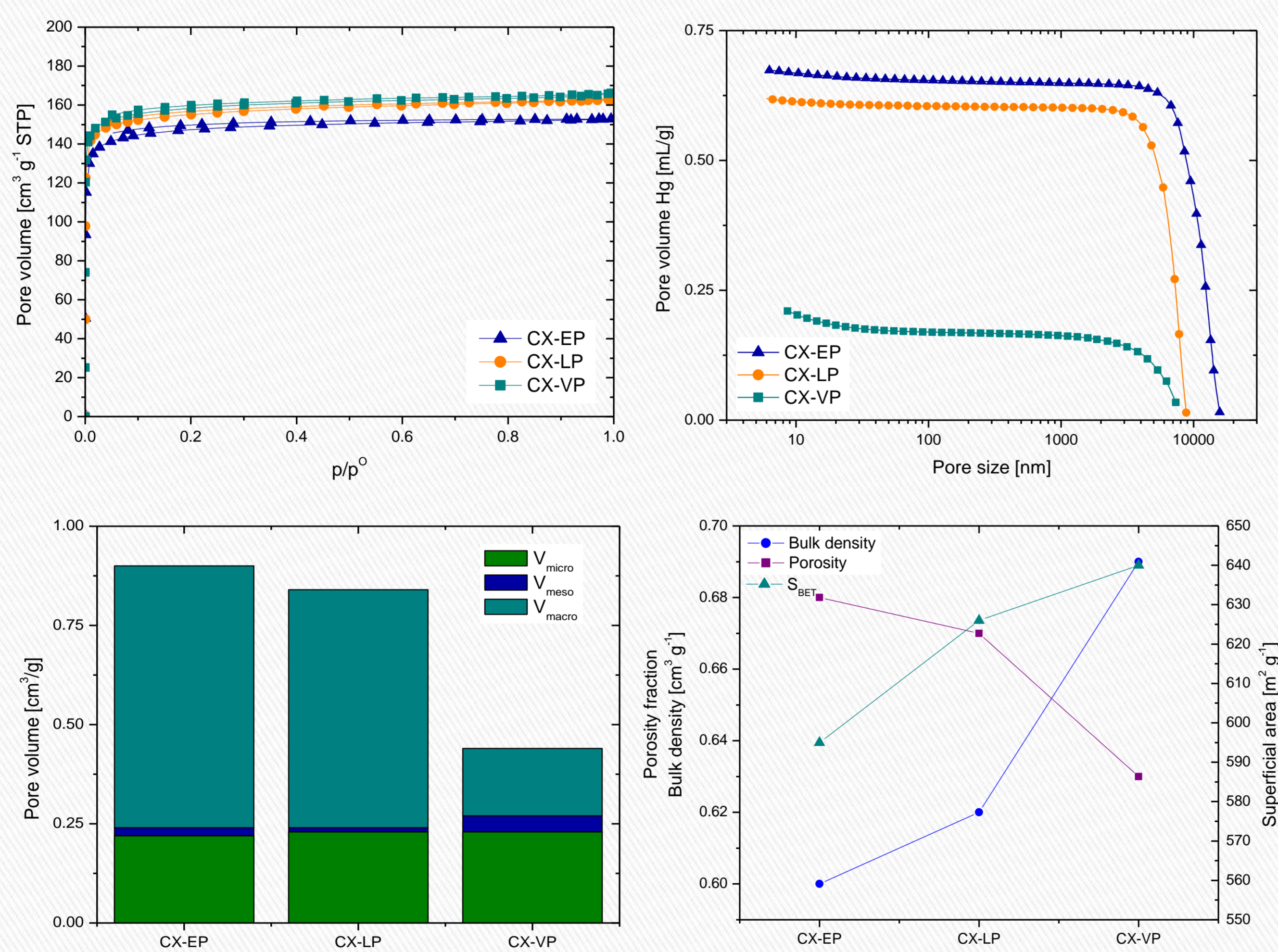
Introduction

Carbon nanomaterials with different structures (i.e. fibers, tubes, spheres) have been widely studied in the last decades for many applications in the fields of energy, electronics, catalysis and biotechnology with promising results [1]. However, the synthesis of these materials includes methodologies such as catalysis, vapor- or electro-deposition and the use of templates; which makes it necessary to develop effective processes for their production.

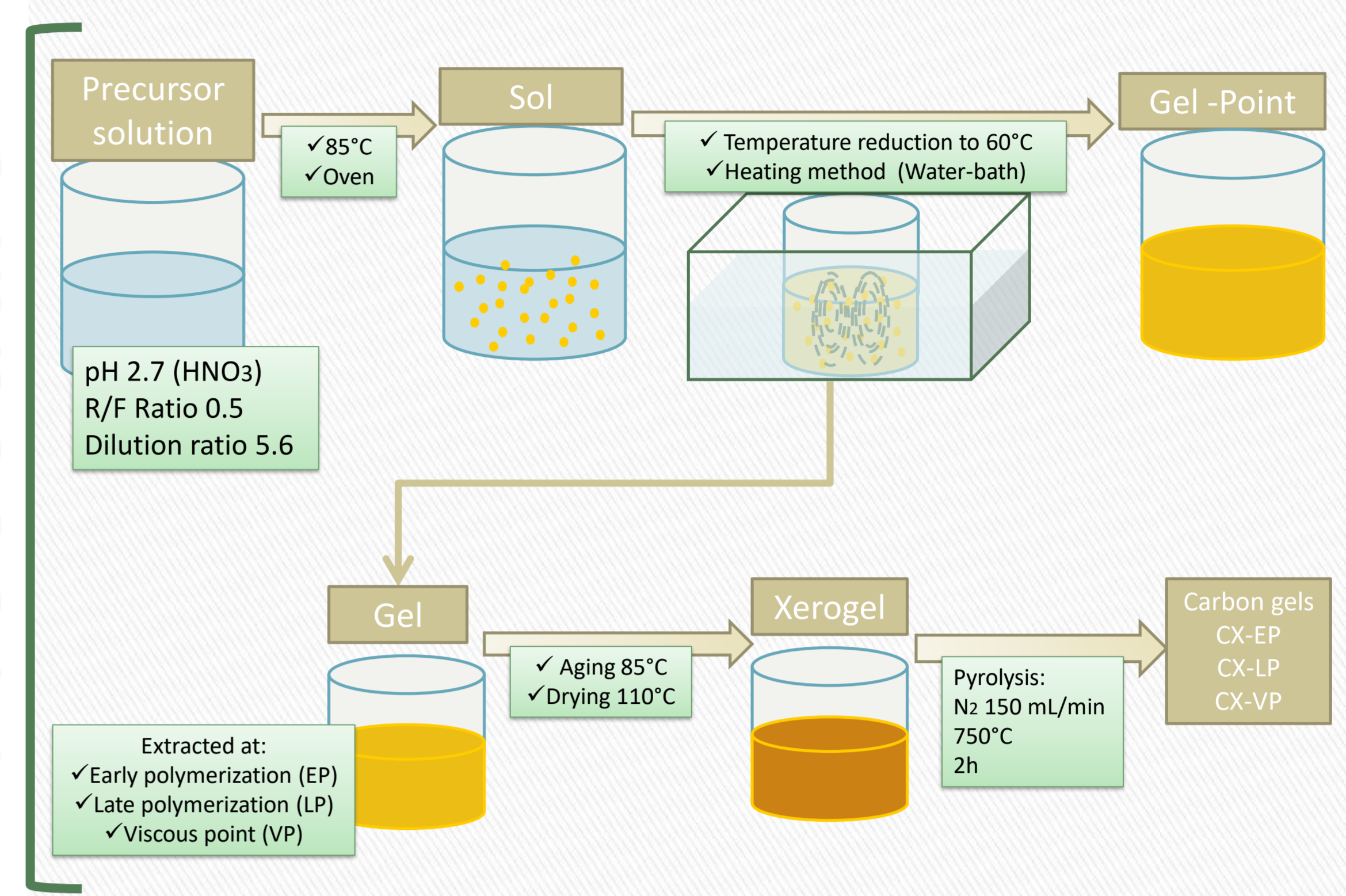
Carbon gels are considered very interesting materials for a wide range of applications, and certainly, their most valued property is the ease when tuning their morphology and porous properties [2,3]. In this study, simple parameters which control the sol-gel chemistry are modified to influence the nucleation and growth of the resultant network, causing the formation of fibers as part of the structure of the carbon gel.



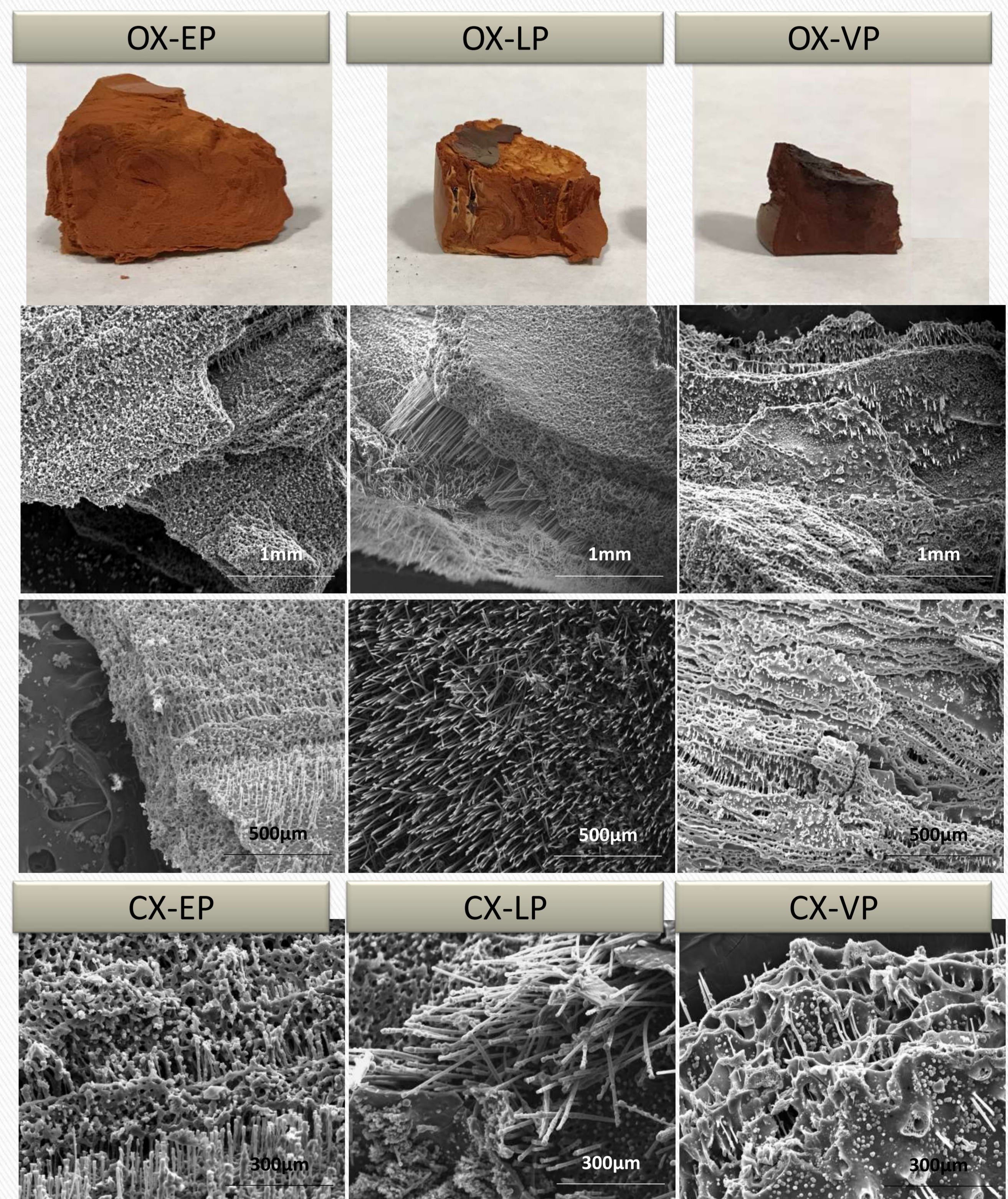
Porous characterization and properties evolution



Procedure



Morphology and filaments evolution



Results

Conclusions

The temperature during polymerization of RF materials may cause a great influence in their final morphology. In this work, slight changes of temperature during the synthesis favored the formation of polymeric fibers, instead of the classical nodules of RF gels. These fibers are for the very first time produced directly by a sol-gel process, under very soft operating conditions.

The fibers formation is specially favored, not only by the heating procedure used but also if the precursor mixture is allowed to a polymerization process until just before it becomes viscous (i.e. late polymerization point). Furthermore, this end point for the polymerization process, not only produces easily materials with polymeric fibers, but also leads to a material with a very good combination of high porosity, surface area and pore volume.

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