Sampling Challenges in Real Industrial Settings: Lifecycle Insights from EV battery casings and ATEX Tanks

M. Martínez-Junquera[1], E. Villaro[1], J. Gómez[1]

[1]Avanzare Innovacion Tecnologica S.L, Avda. Lenticares 4-6, Poligono Industrial Lentiscares, Navarrete, Spain

Introduction

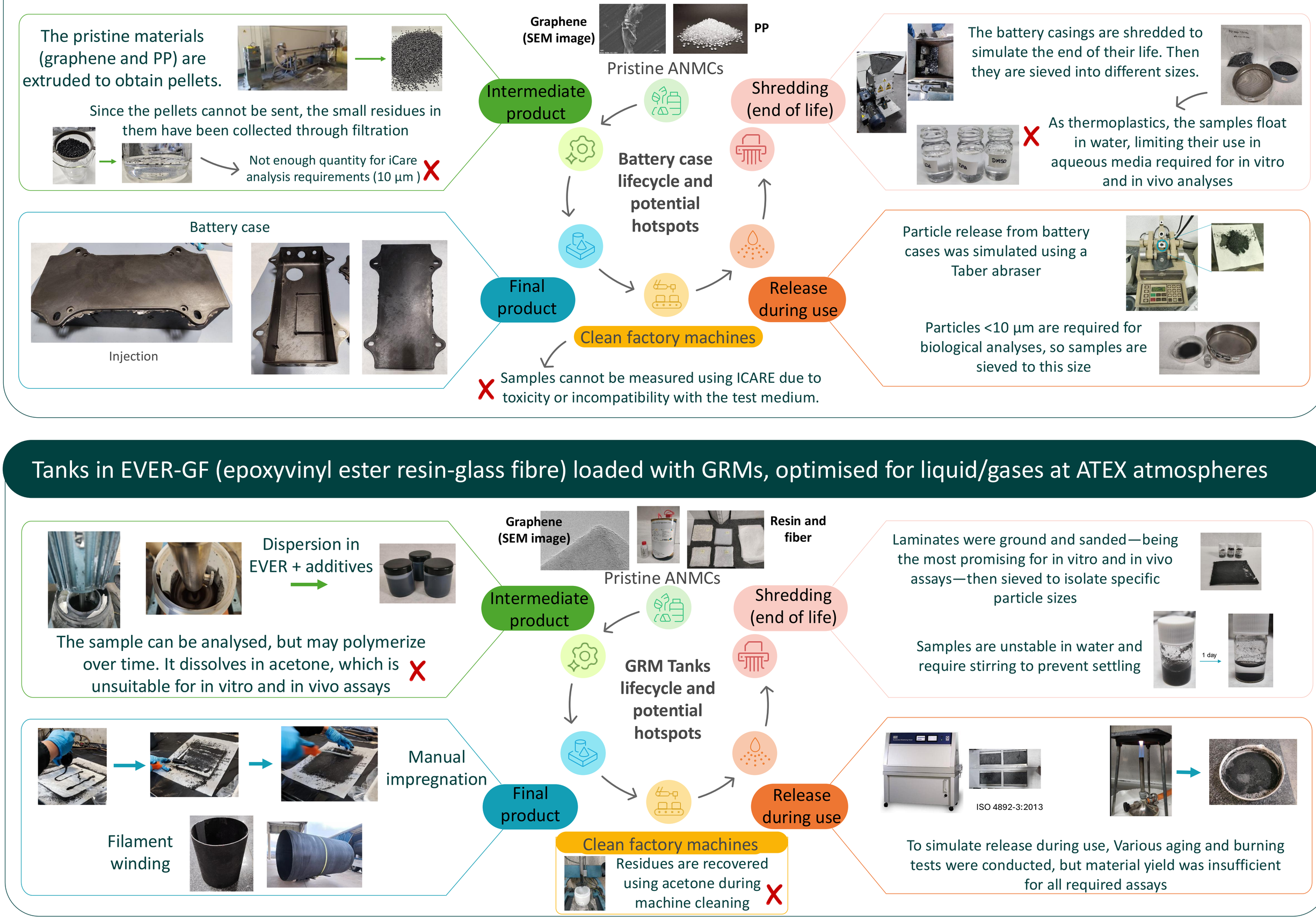
The iCare project aims to develop industry-relevant tools and protocols to evaluate changes in nanomaterials' morphology, chemical composition, and reactivity across their full lifecycle. The objective is to establish a model system to characterize and predict the potential impact of nanomaterials on human brain health, while enabling their detection and assessment in complex industrial matrices.

As an industrial partner, **AVANZARE** contributes by collecting representative samples at various lifecycle stages of two graphene-enhanced products:

- Battery cases made with thermoplastics enhanced with graphene
- ATEX-certified tanks made with epoxy-vinyl ester resin and glass fibre loaded with graphene

To evaluate biological impact, in vitro and in vivo analyses require particles <10 µm, which presents a limitation due to the physical properties of our materials. Efforts are made throughout the production and sampling process to address this constraint and ensure the recovery of appropriately sized particles.

Battery cases with better performance to impact, flame retardancy and heat dissipation



Tanks in EVER-GF (epoxyvinyl ester resin-glass fibre) loaded with GRMs, optimised for liquid/gases at ATEX atmospheres

Conclusion

Obtaining materials from each lifecycle stage that meet particle size, dispersibility, and stability requirements in aqueous media is challenging. Industrially processed materials often do not conform to the specific needs of analytical laboratories, so we adapt samples to enable accurate analysis. This ensures iCare's methods reflect real conditions, aiding safety and regulation of nanomaterials.

Funded by the European Union

iCare Integrated Assessment and Advanced Characterisation of Neuro-Nanotoxicity