Plastics and Composites Performance : Cost & Weight

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Outline

- What are the key mechanical properties for plastics and composites ?
- Which polymer gives the best performance : cost & weight ?
- How can fillers be used to improve these properties even further ?
- Are nano-composites cost competitive ?
- How does the future look ?

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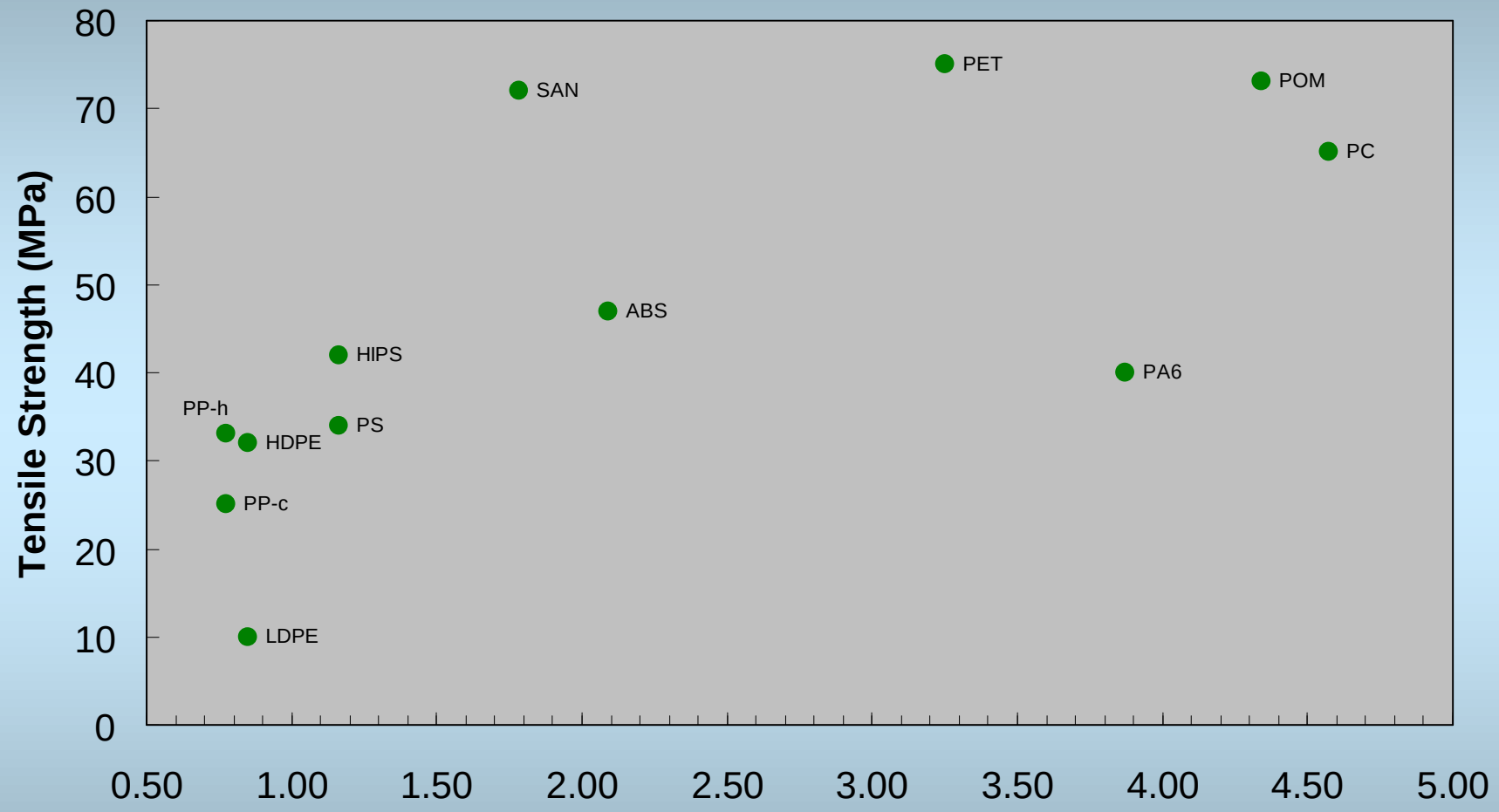

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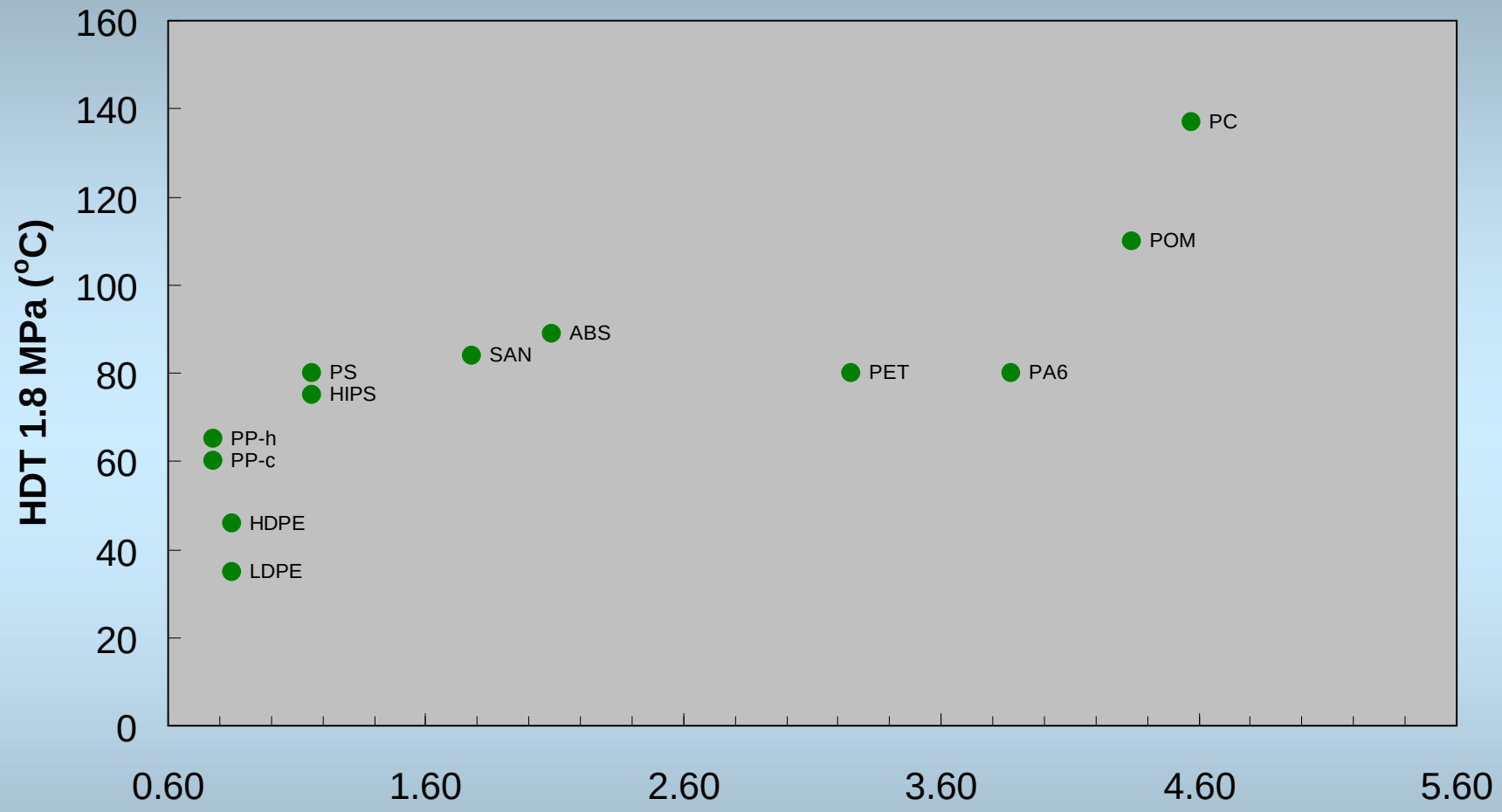

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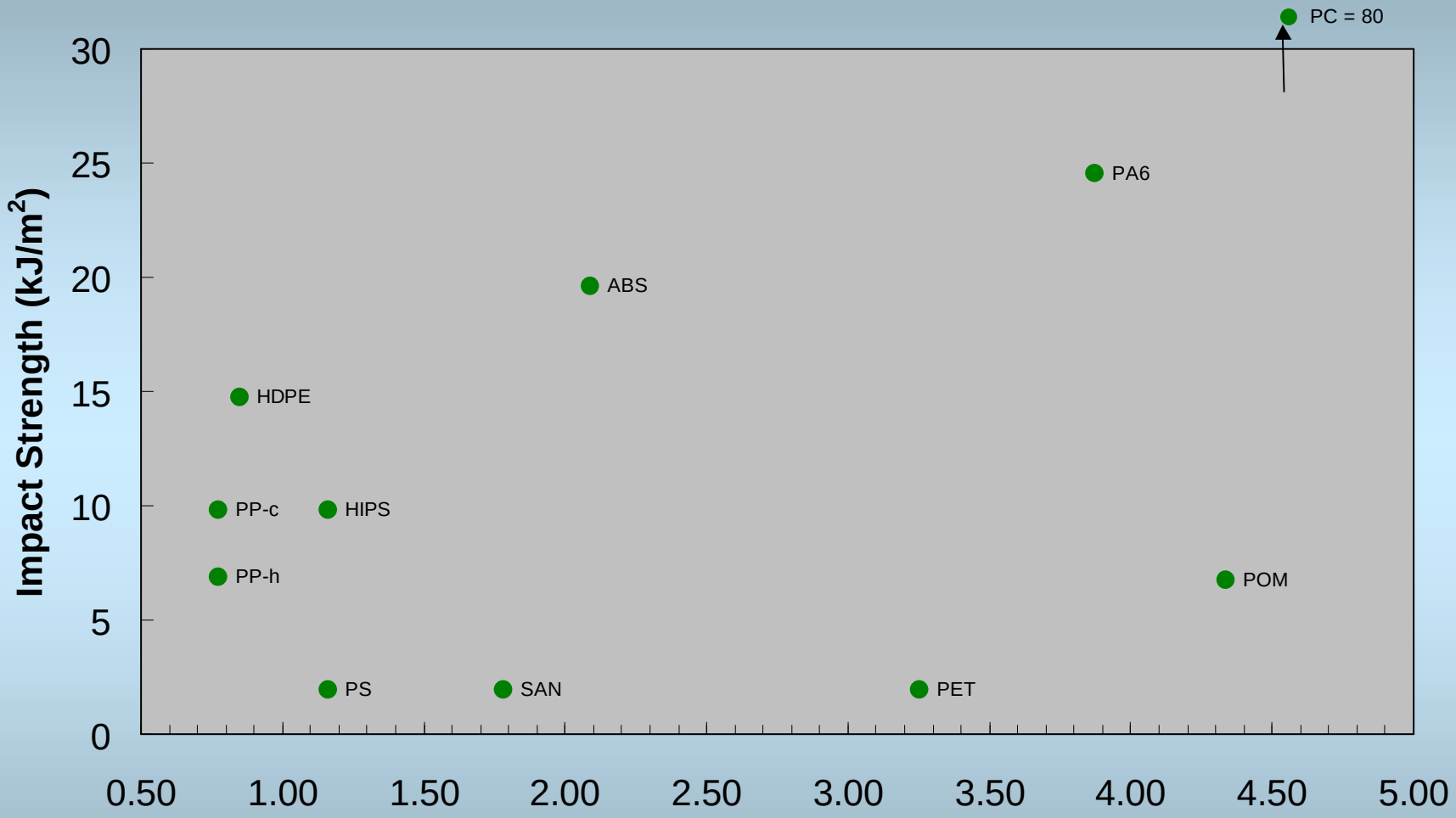

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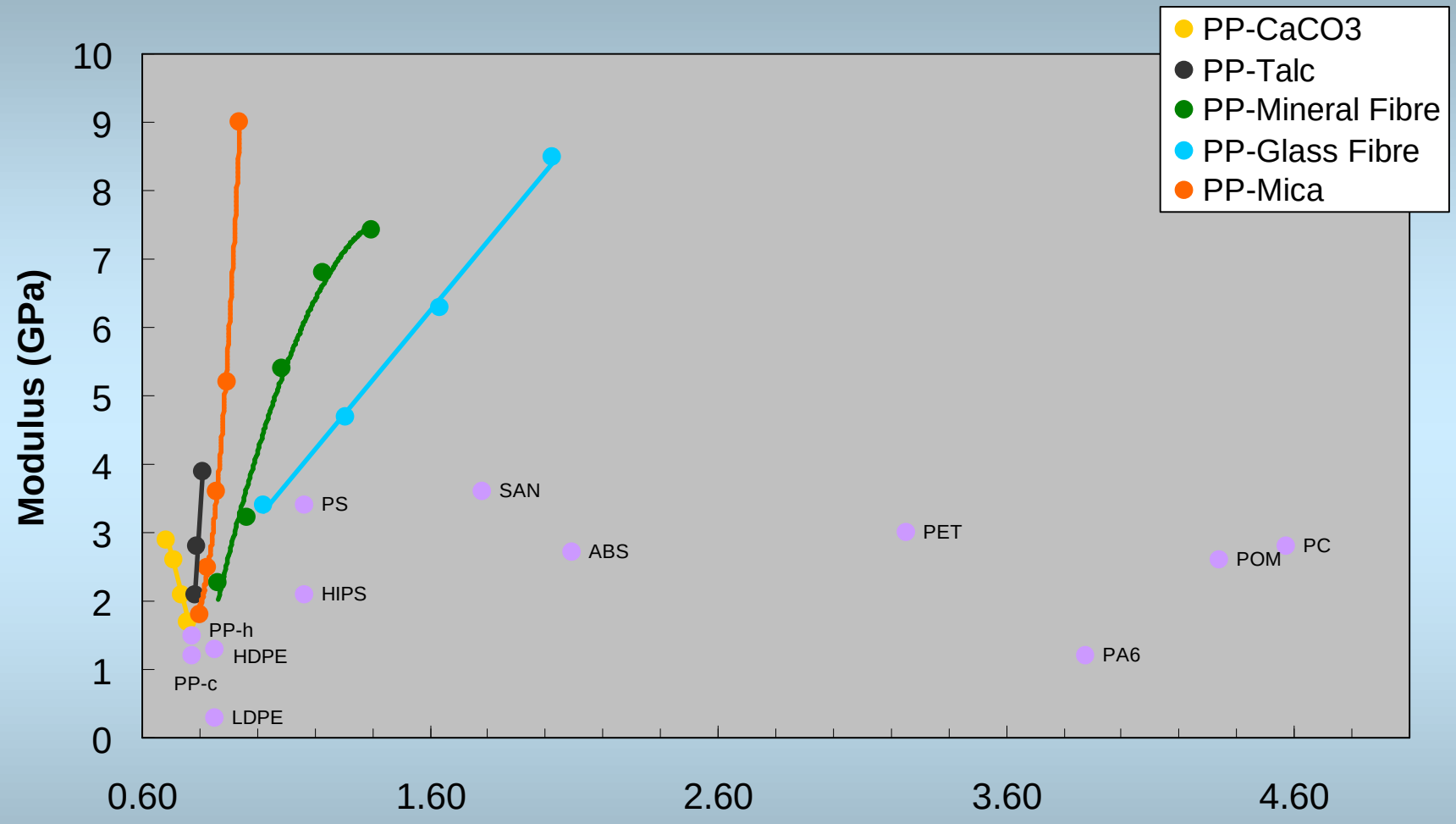

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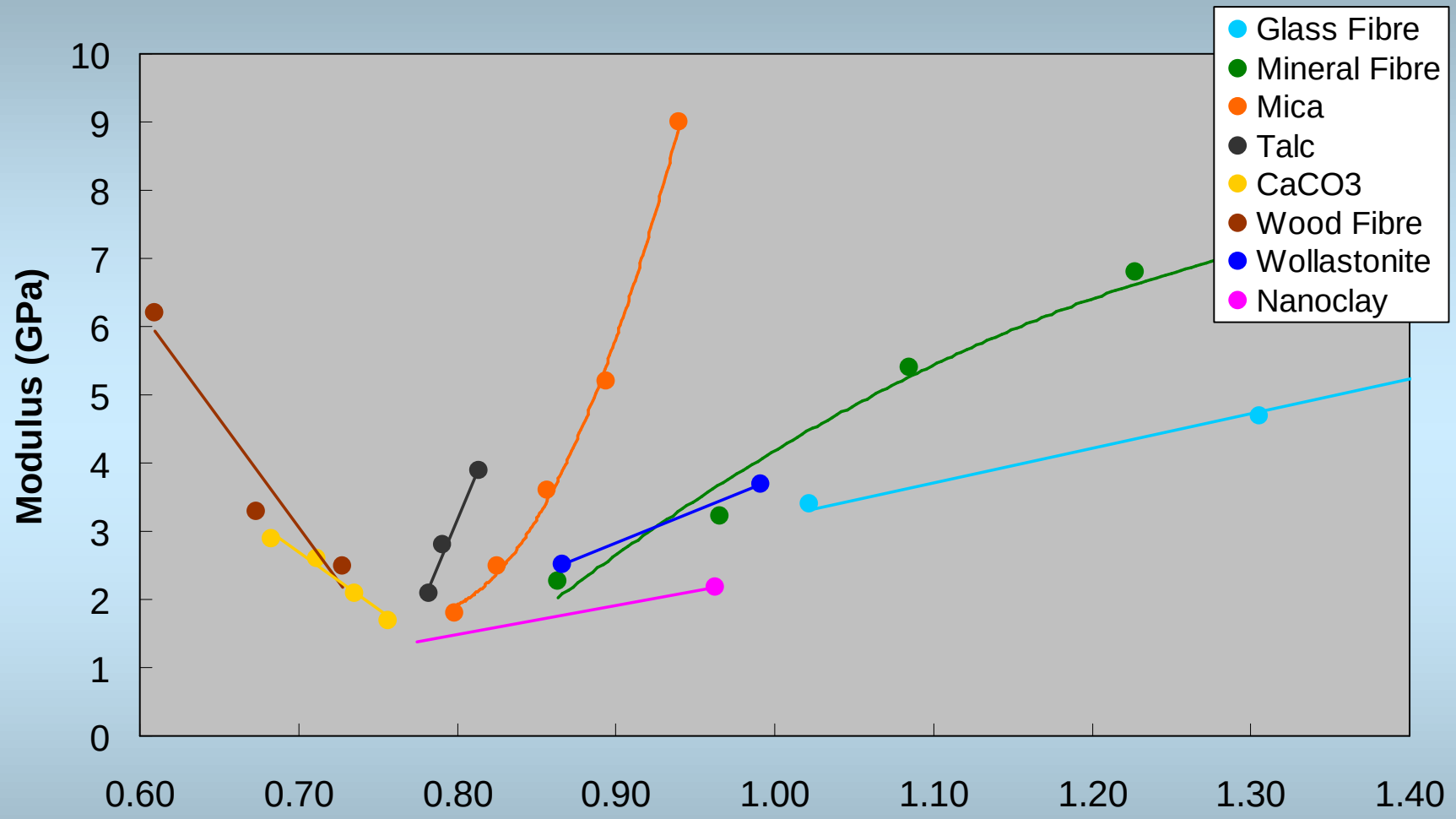

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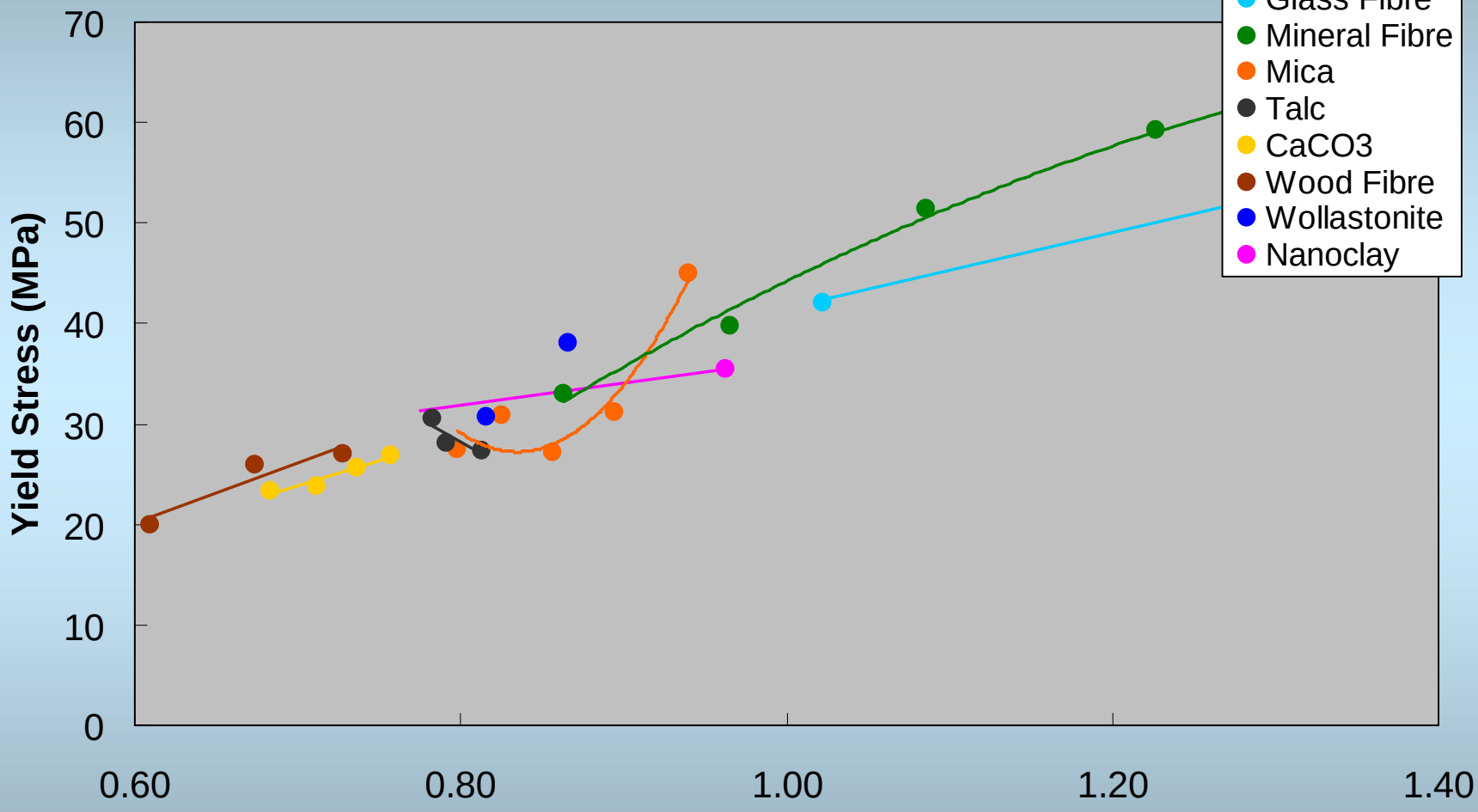
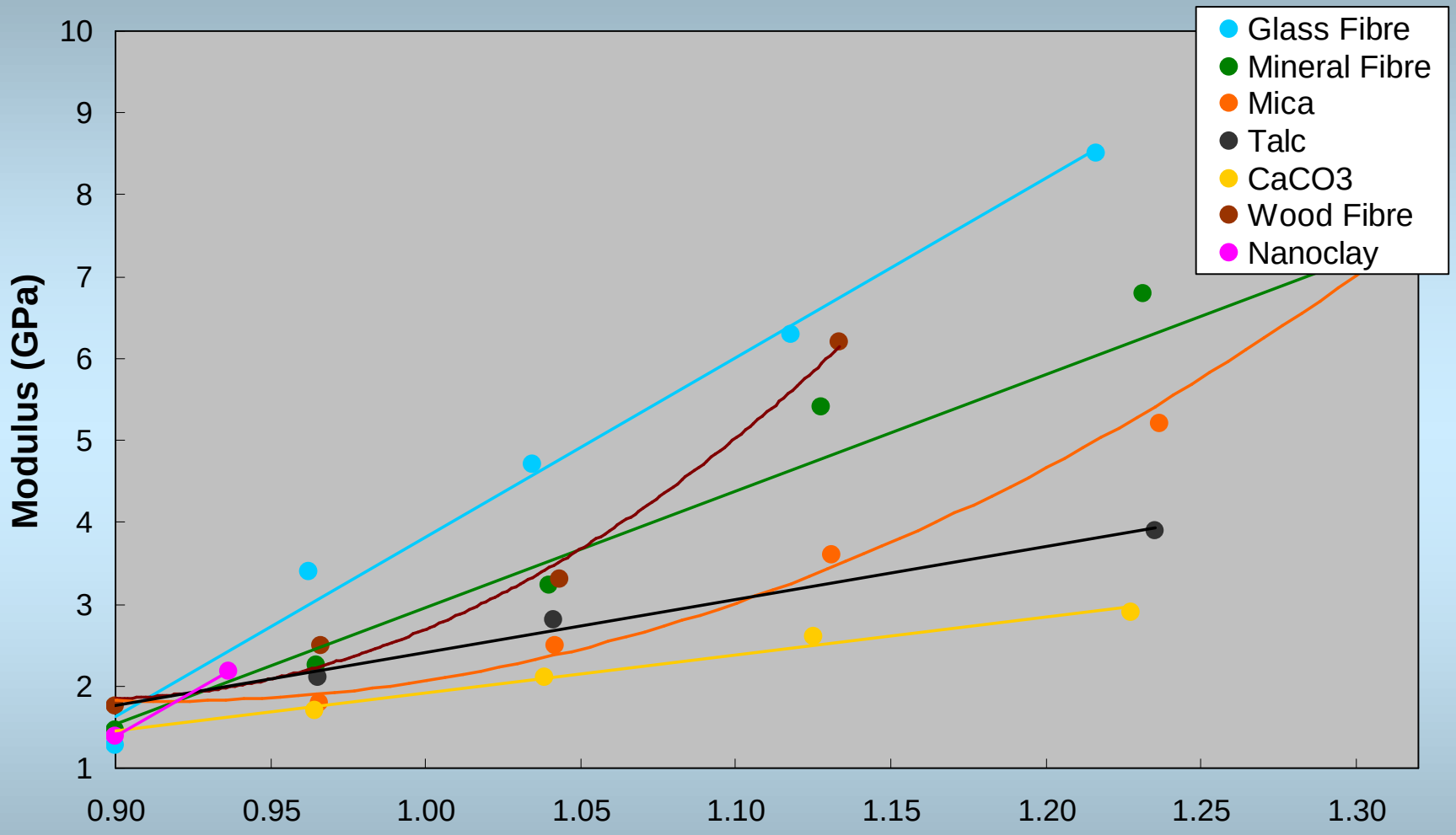

Yield Stress (MPa)
70
60
50
40
30
20
10
0
0.60
0.80
1.00
1.20
1.40
Cost of Composite (Euros / litre)
Glass Fibre
Mineral Fibre
Mica
Talc
CaCO3
Wood Fibre
Wollastonite
Nanoclay



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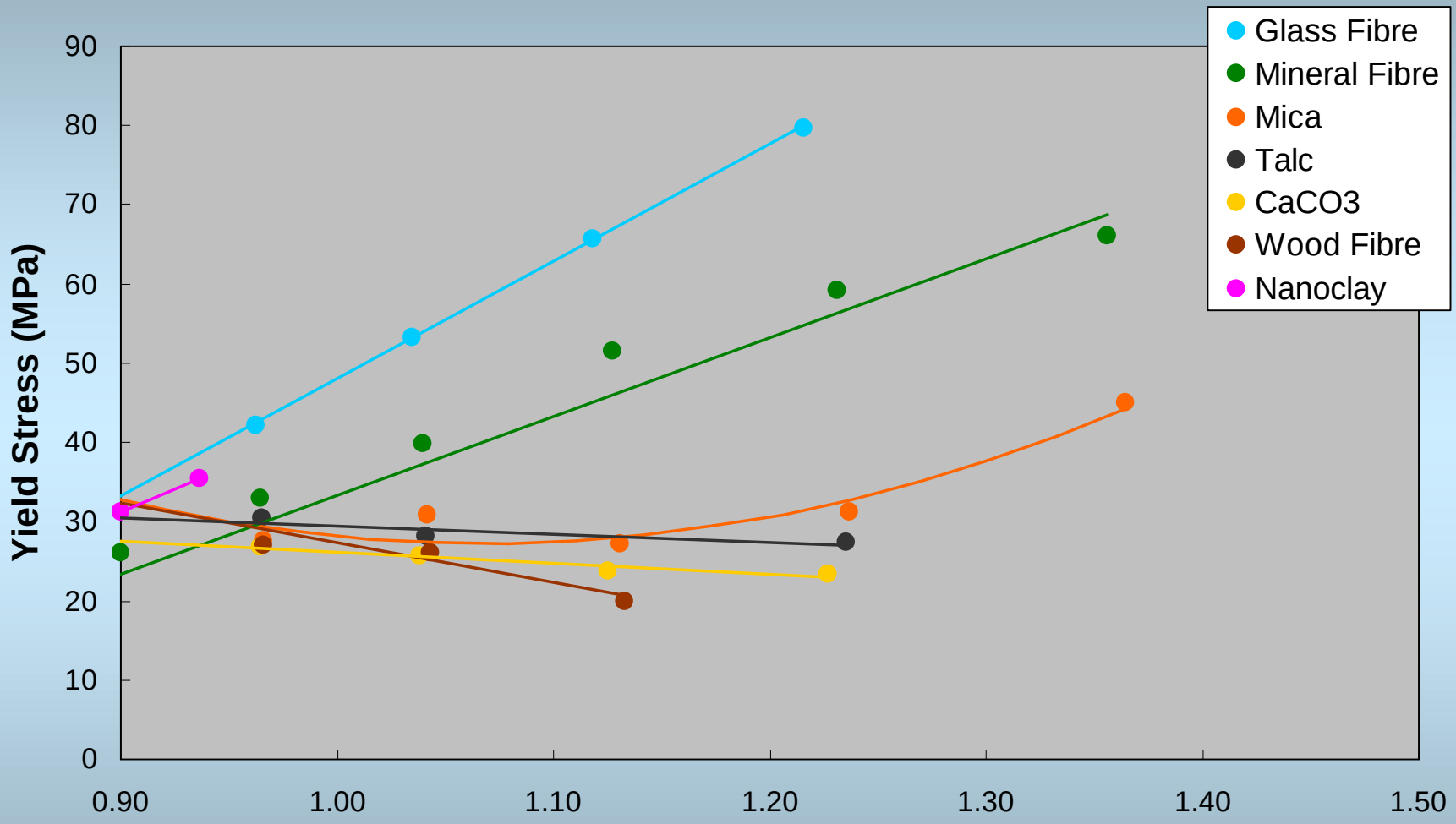

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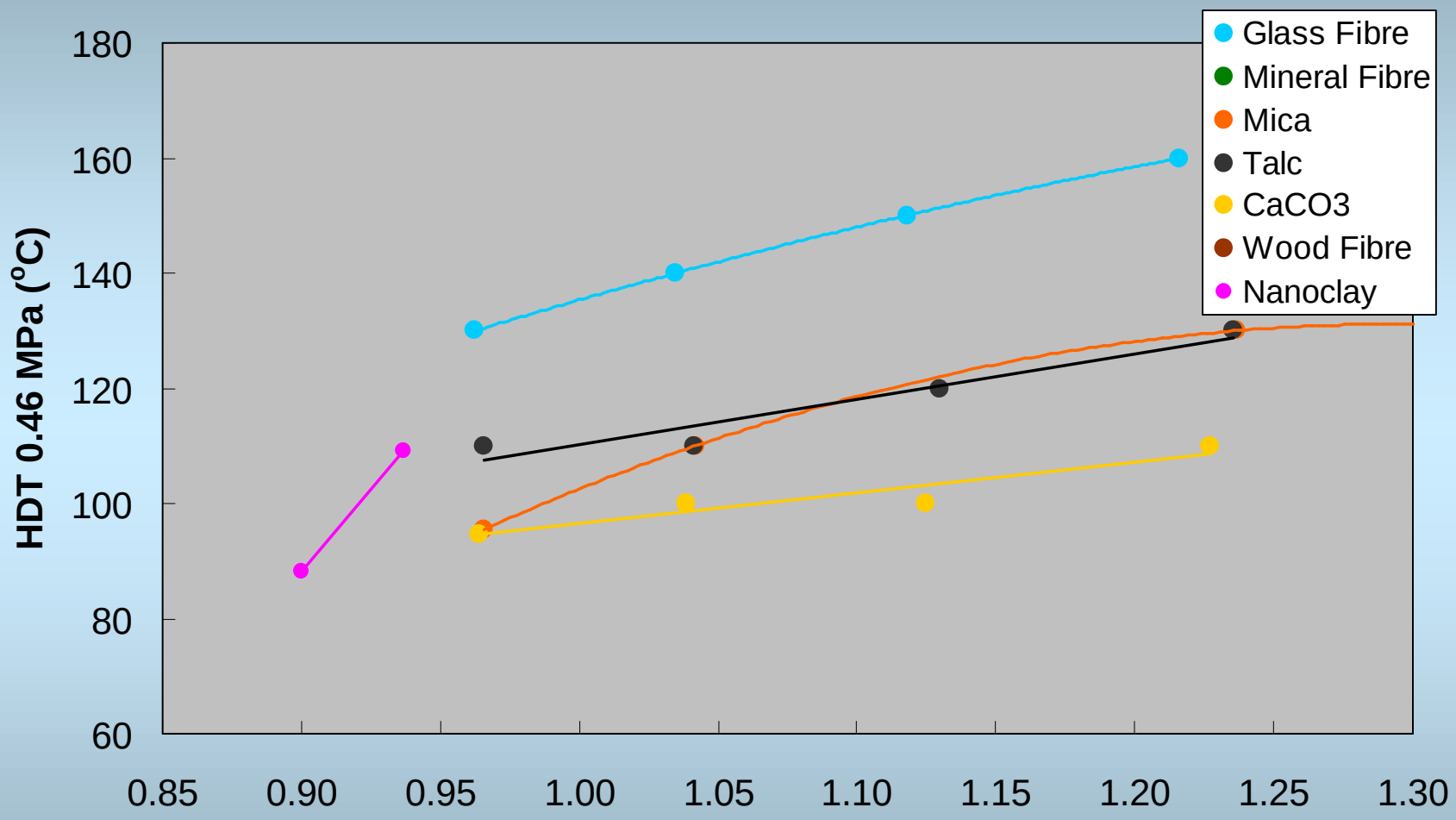

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Conclusion

- The key mechanical design properties are modulus, yield strength, impact strength and HDT.
- PP is the best matrix in terms of performance : cost.
- For household appliances, cost is most important, whereas for the automotive industry material density is also a factor.
- Fillers can enhance the properties of PP to give composites of even better performance : cost & performance : weight.
- Nano clay is not yet cost competitive with glass fibre, but better surface finish and flame retardance could offset that.
- In the future we can expect to see continued growth in the composites market. All fillers will continue to have a place and nano-composites will emerge as the cost decreases.