GLOXIL iM16k MAM in peroxide cured FKM
Partial replacement of carbon black for weight and cost reduction

Status quo

Hollow glass microspheres (HGM):

- used for weight-reduction + preserving the physical properties
- mainly in thermoplastics

BUT: high raw material costs → only useful in high priced elastomers

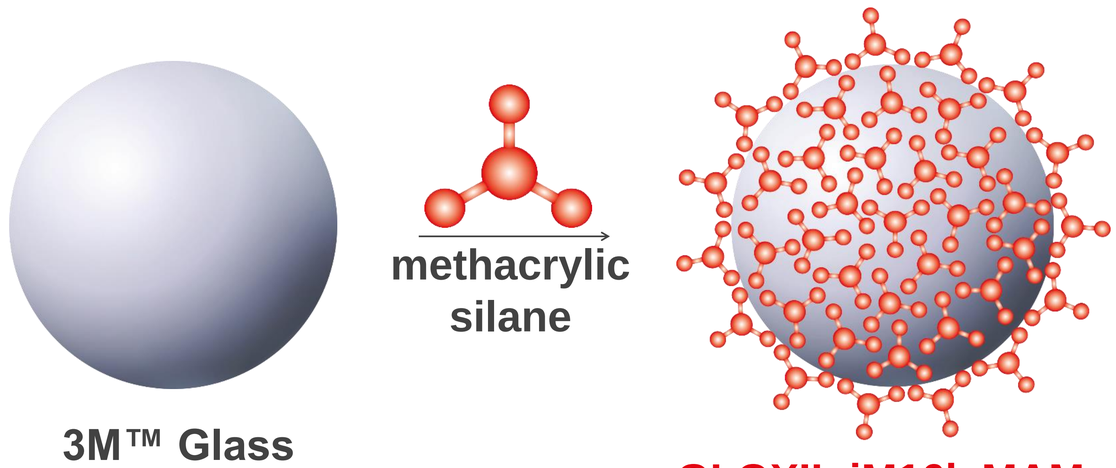
Objective

Combination of HGM with carbon black in peroxide cured FKM →

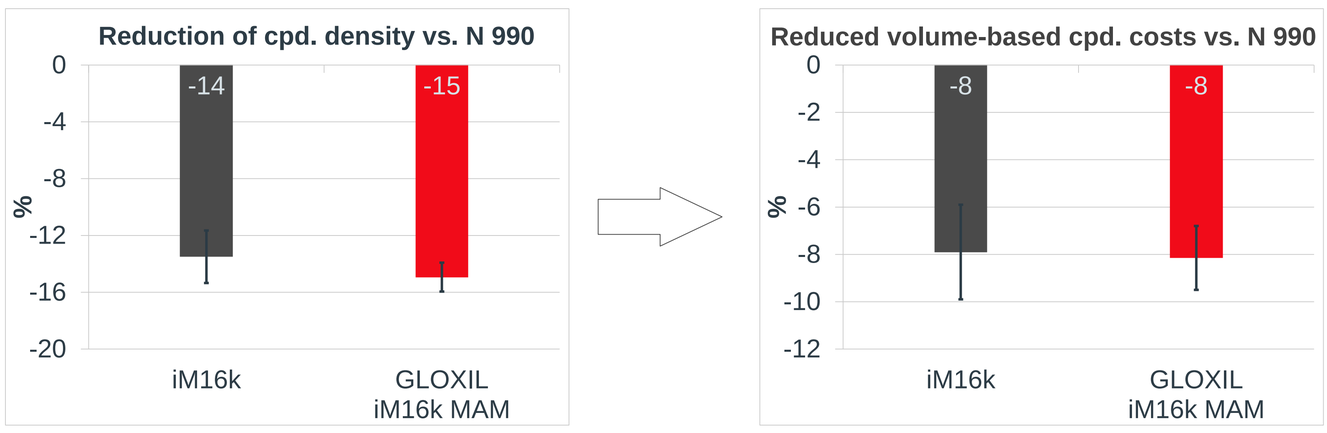
- compound density
- compound costs
- mechanical properties
- resistance to various liquid media

Formulation + hollow glass microspheres

in phr	Reference	Replacement with HGM
Viton GAL-200S	100	100
Zinkoxyd aktiv	3	3
TAIC-70	4.3	4.3
Trigonox 101-50D-pd	2	2
Carbon Black N 990	30	12
HGM	-	12
Curing: 7' / 177 °C, post-cure: 2 h / 230 °C		
Obtained hardness level: 70 Shore A		



Effect on compound costs



Combination of N 990 with **GLOXIL iM16k MAM**

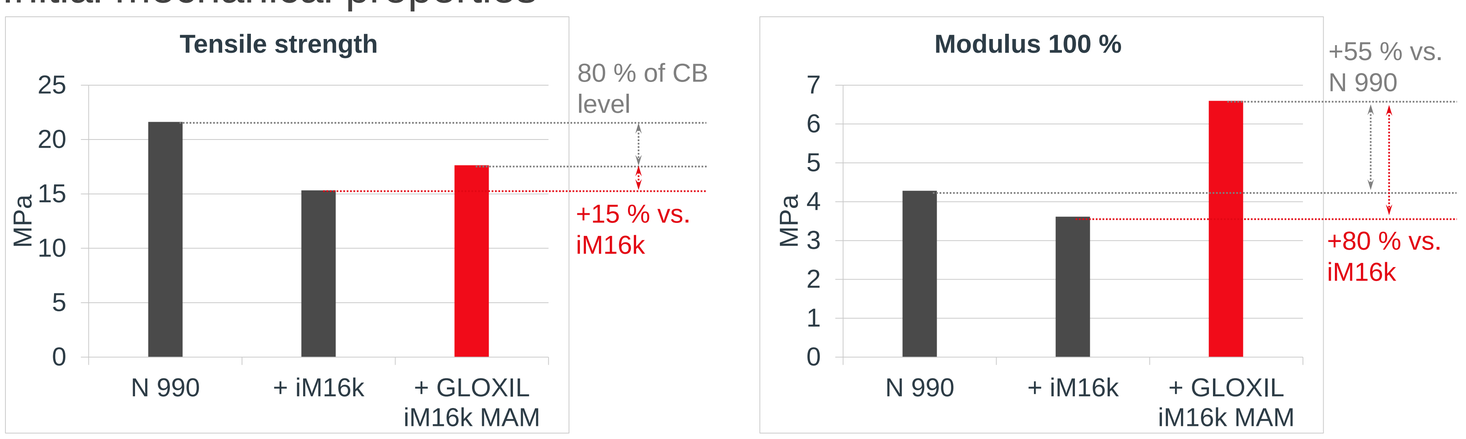
- reduced compound density

leads to

- decreased compound costs

Results

Initial mechanical properties



GLOXIL iM16k MAM
vs. N 990 or iM16k

- markedly increased modulus

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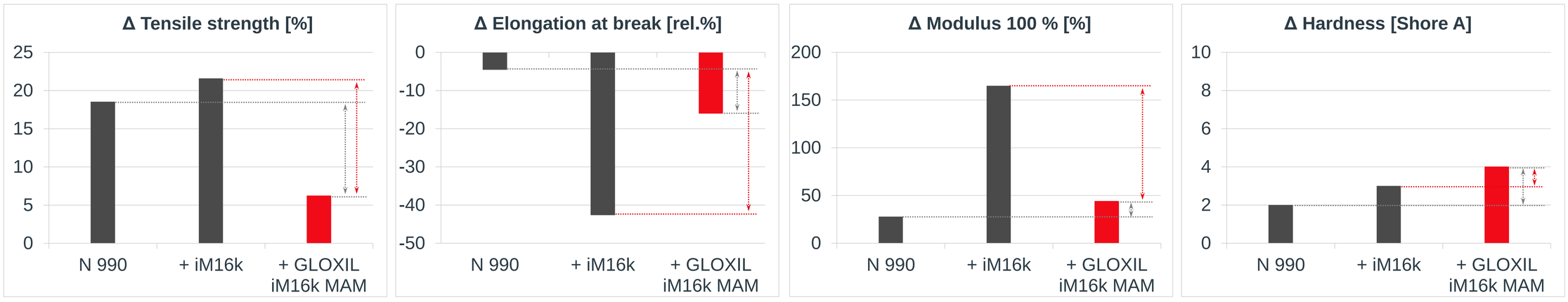
Results

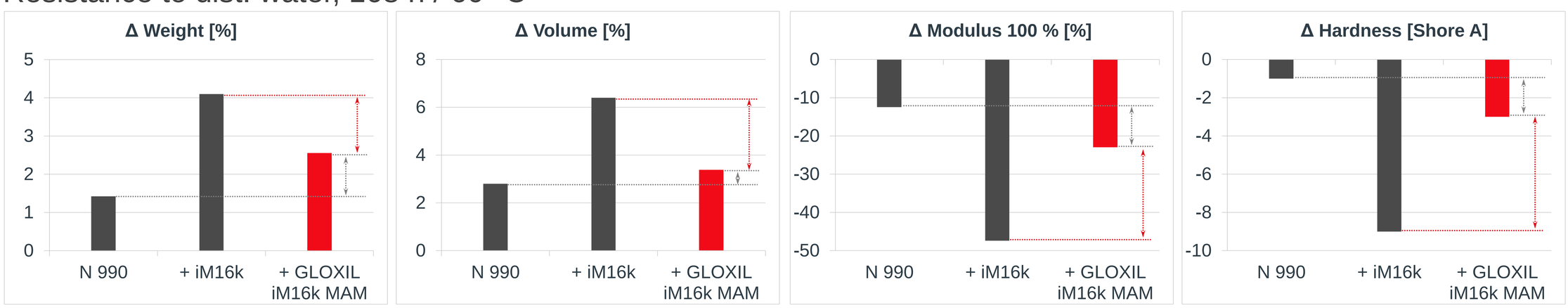
Resistance to hot air, 94 h / 230 °C, 30' after removal



GLOXIL iM16k MAM vs. N 990: lower change of tensile strength, otherwise similar properties

GLOXIL iM16k MAM vs. iM16k: markedly lower change of properties

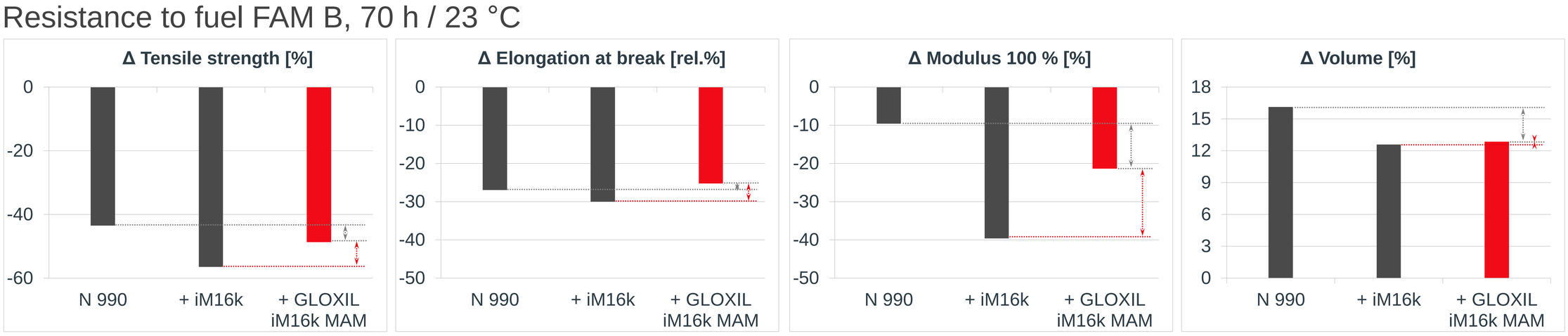
Resistance to dist. water, 168 h / 60 °C



GLOXIL iM16k MAM vs. N 990: comparably low change of base properties

GLOXIL iM16k MAM vs. iM16k: markedly lower change of base properties + lower water absorption

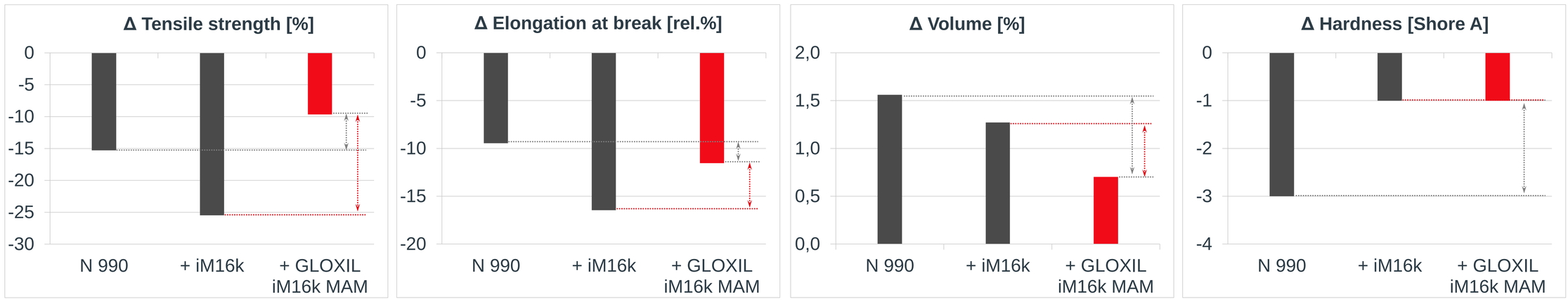
Resistance to fuel FAM B, 70 h / 23 °C



GLOXIL iM16k MAM vs. N 990: comparable change of base properties + lower fuel absorption

GLOXIL iM16k MAM vs. iM16k: lower change of base properties

Resistance to oil OS206304, 168 h / 150 °C



GLOXIL iM16k MAM vs. N 990: comparable change of base properties + more stable hardness + lower oil absorption

GLOXIL iM16k MAM vs. iM16k: markedly lower change of tensile properties + lower oil absorption

Summary

GLOXIL iM16k MAM

Functionalization of 3M™ Glass Bubbles iM16k with methacrylic silane

- increased tensile strength
- markedly increased moduli
- improved resistance to hot air, water, fuel and oil

Partial replacement of CB with **GLOXIL iM16k MAM**

- reduction of
  - compound density
  - compound costs
- markedly increased moduli
- comparable resistance to
  - hot air
  - water
- improved resistance to
  - fuel
  - oil