

baytubes® as Filler in HNBR Compounds

2007

BMS-SIP-CNT



Bayer MaterialScience

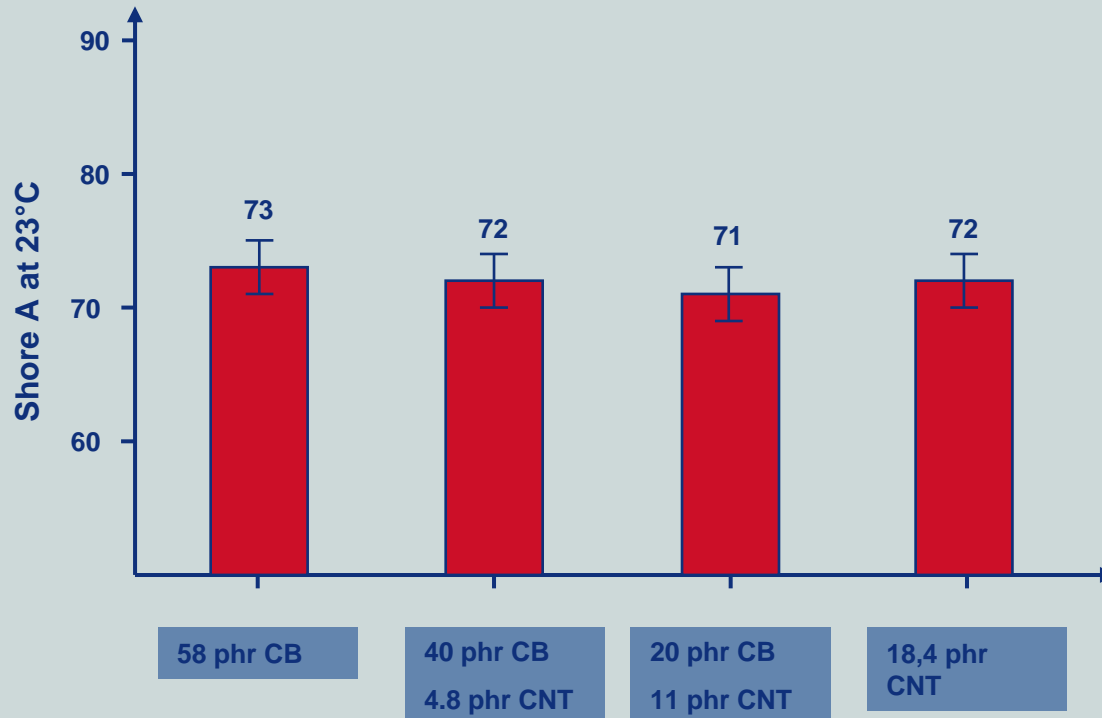
Scope

- Comparison of properties of HNBR compounds
- 4 different compounds
- Variation of carbon black and **baytubes®** loading
- Hardness level 70 ShA @ 23°C

Compounds

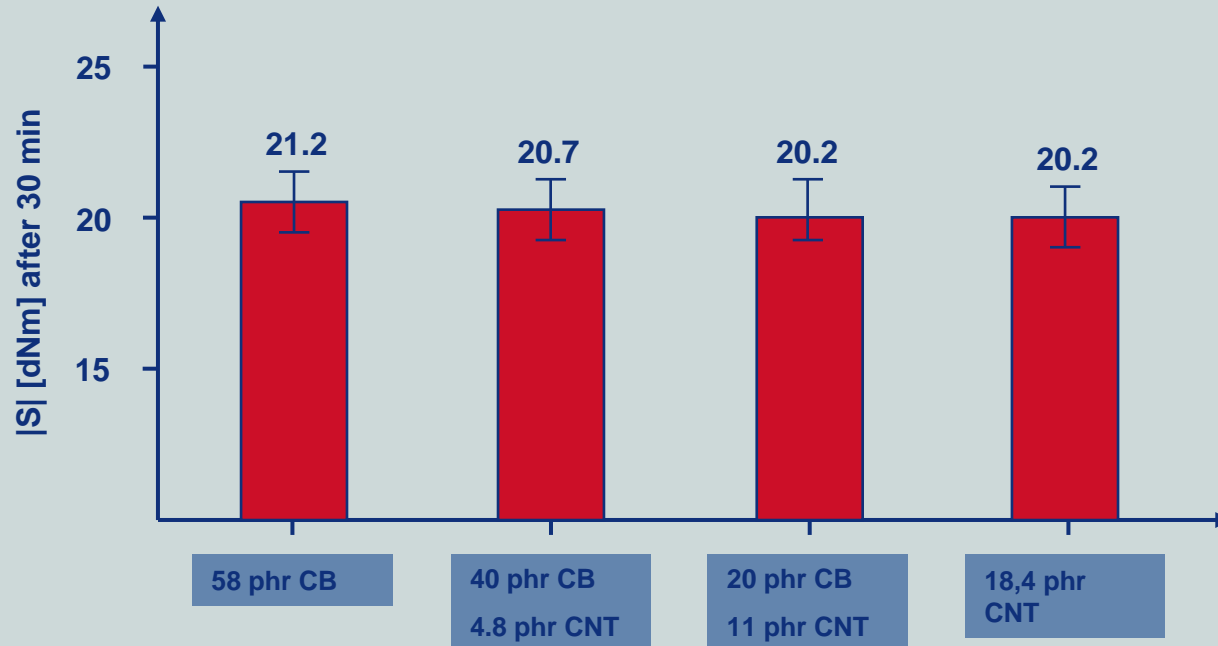
	CB 58 phr CNT 0 phr	CB 40 phr CNT 4,8 phr	CB 20 phr CNT 11 phr	CB 0 phr CNT 18,4 phr
HNBR	100	100	100	100
Peroxide	4	4	4	4
Carbon Black	58	40	20	0
baytubes®	0	4,8	11	18,4

Hardness



Compounds of same hardness can be achieved by replacing 10phr CB by appx. 3 phr **baytubes®**

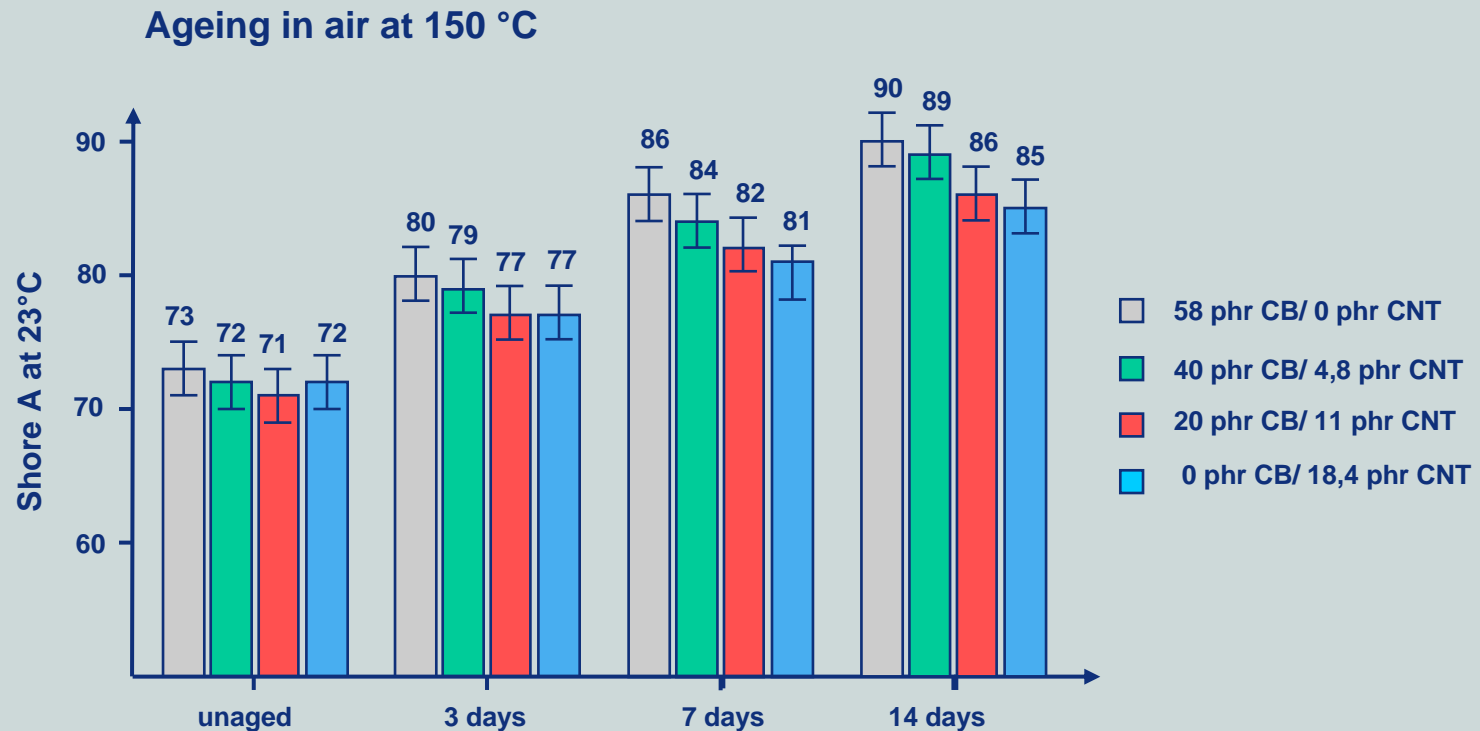
Vulcanization (MDR)



Similar level of torque

-> Same reinforcement level through filler at 180 °C at same level of vulcanization

Ageing (influence on hardness)



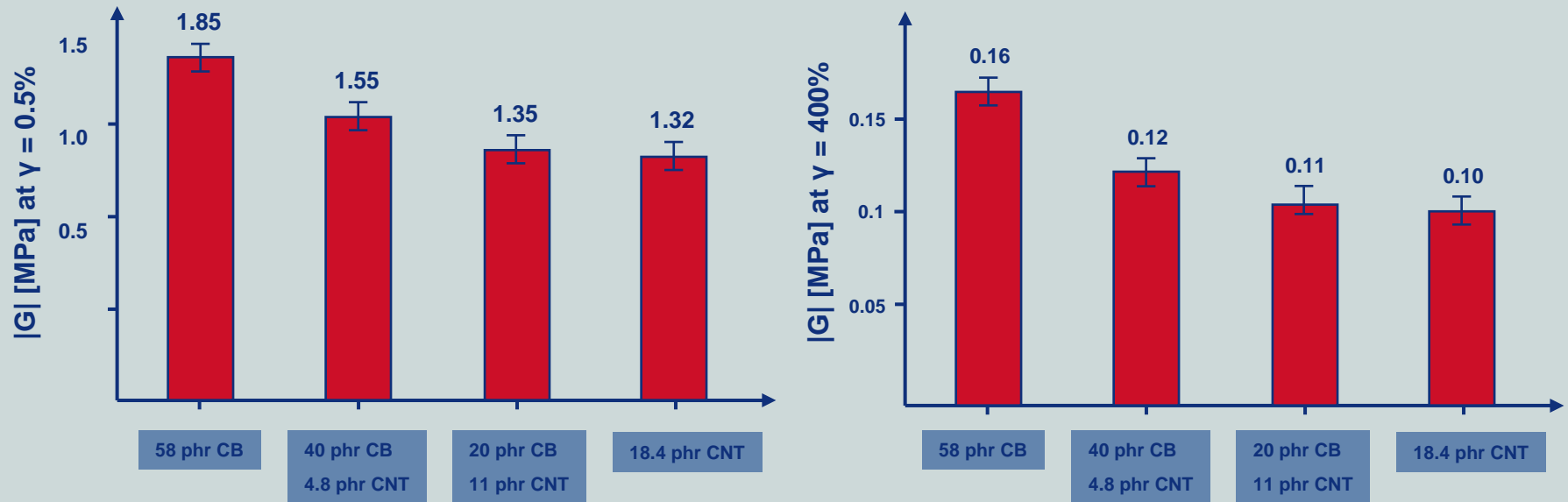
Hardness is increasing during ageing (ShA at 23°C)
Effect is reduced by replacing CB by **baytubes®**

Mooney



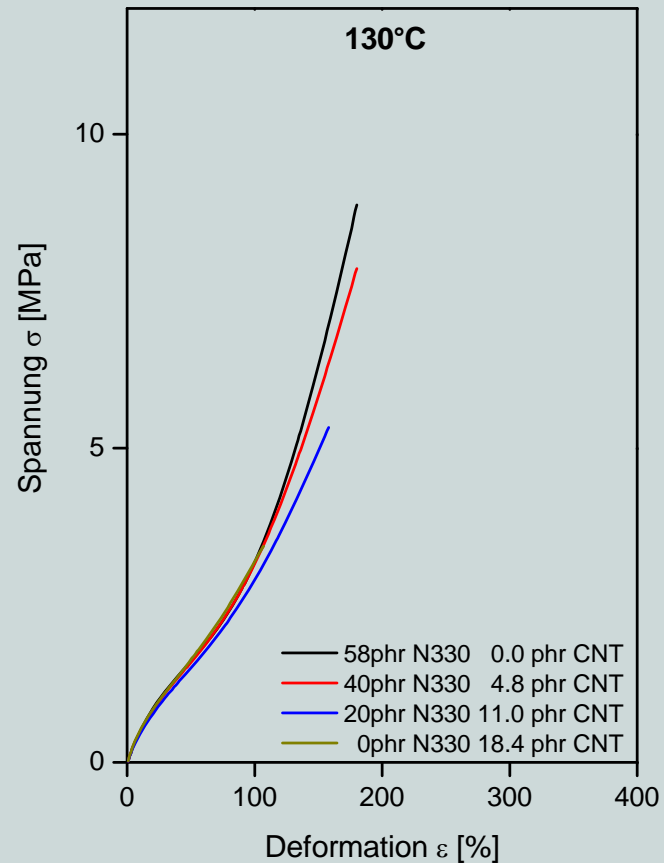
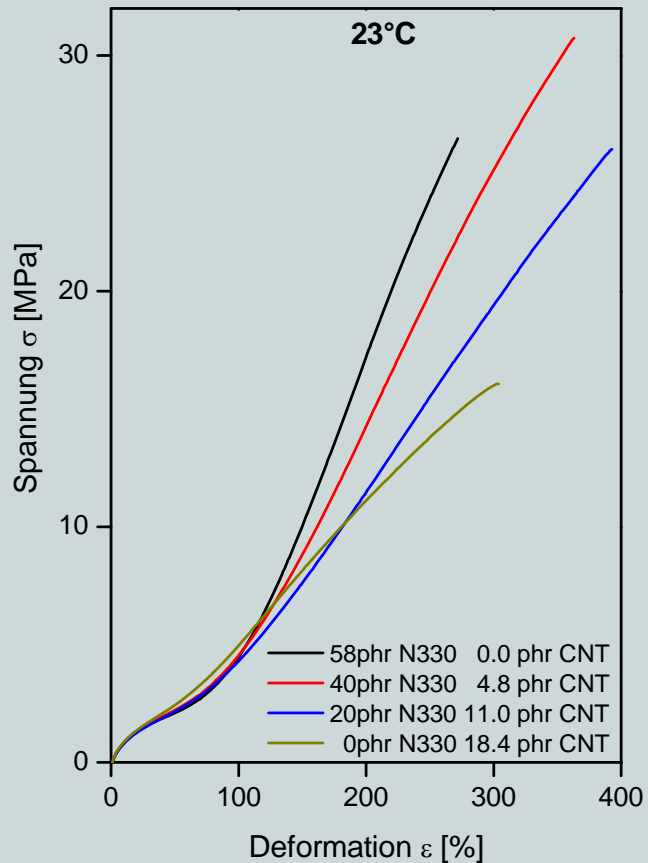
Mooney viscosity is slightly increasing with increasing CNT content

Payne - Effect

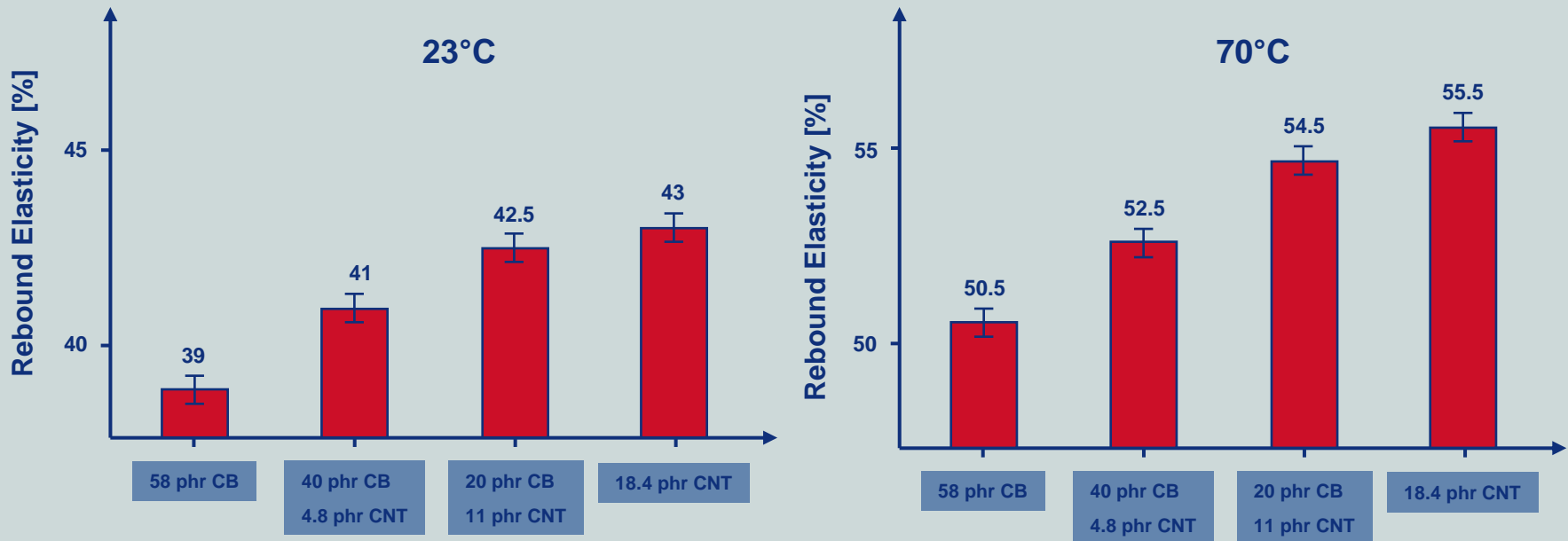


overall reduced filler content is reducing the shear modulus at high and low amplitudes
-> positive effect on processing

Tensile elongation

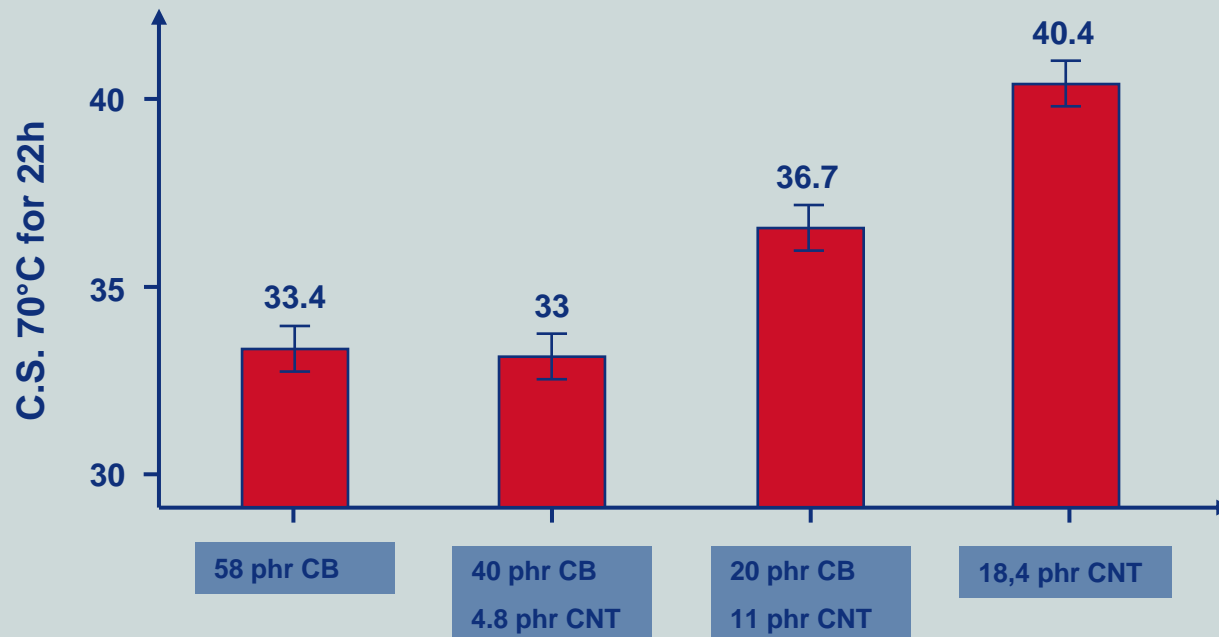


Rebound Elasticity



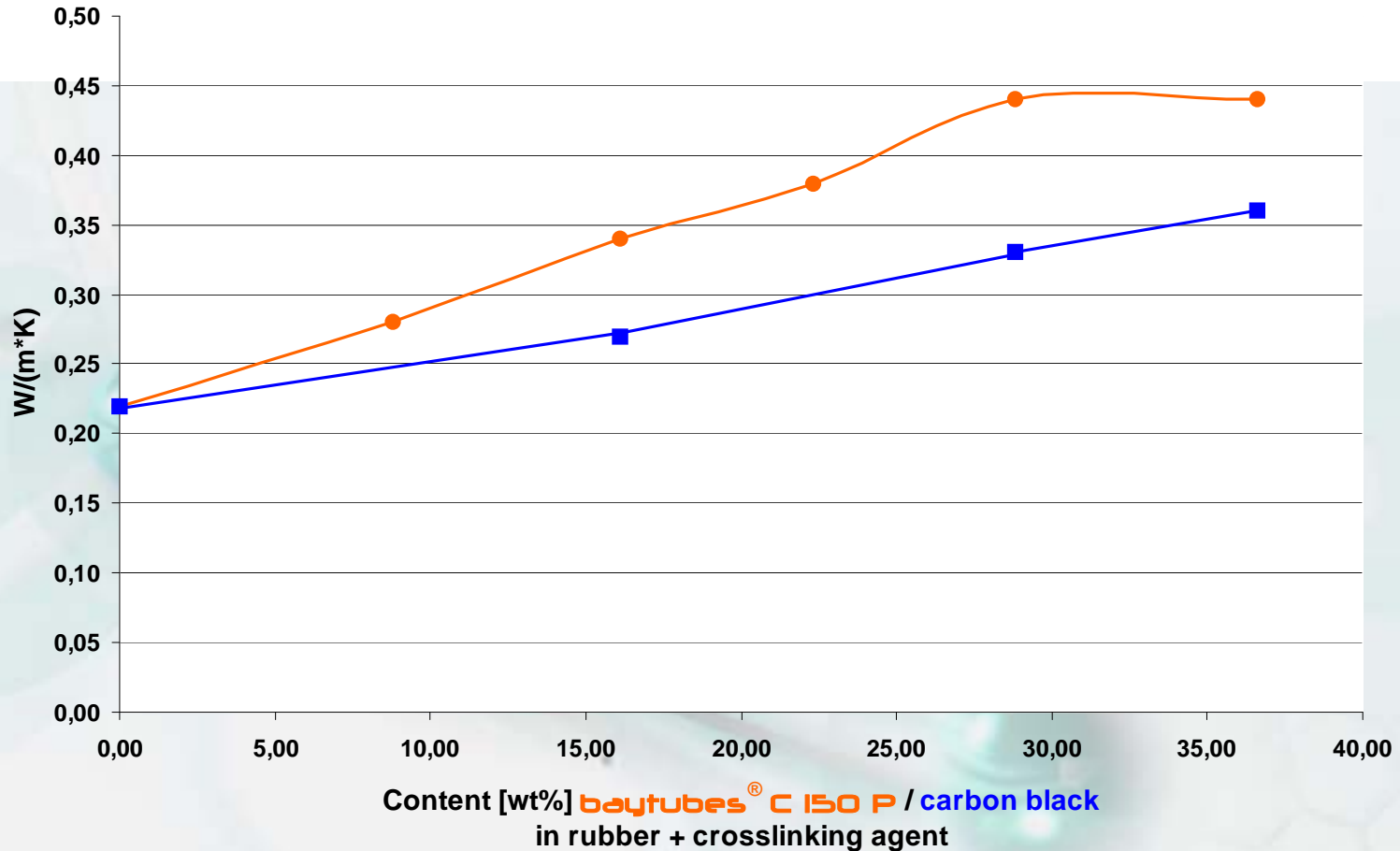
Significant improvement of rebound elasticity with substitution of CB by **baytubes®**

Compression Set



Increasing compression set with increasing CNT loadings

Thermal conductivity



baytubes[®] increase therm. conductivity more than CB with same concentration (factor approx.. 2)