

Technical Bulletin

Therban AT

Quality (lot release) testing



Therban AT - Quality (lot release) testing

Scope of Study

**Therban AT* is tested in a standard HNBR
lot release test to assure high quality**

* Therban AT VPKA 8966

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Conclusion

Significant improvements in processing properties are observed when comparing Therban AT* with Standard HNBR´s in Lanxess´ sensitive lot release test recipe**

* Therban AT VPKA 8966

** Standard 34 ACN / ML 70 and ML 60

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Mixing

Comparing Therban AT* to Standard HNBR´s equal distribution of fillers can be achieved with:**

- **10 % less time for carbon black incorporation**
- **20°C lower mixing temperature (direct addition of peroxide possible !)**
- **15 % lower energy consumption**

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Rheology

- ✓ **Compound Mooney viscosity using Therban AT* decreases by 40 / 30 ME compared to HNBR standard grades****
- ✓ **RPA results: Parallel shift of properties at all frequencies and amplitudes towards lower viscosity indicates better processability and flow properties for all typical rubber processes**
- ✓ **Increased scorch resistance can be observed with AT content due to lower initial Mooney viscosity.**

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Vulcanizate Properties

A slightly lower crosslinking density of the vulcanizate is explained by the lower molecular weight of the Therban AT polymer structure which statistically results in more loose ends that can not take part in physical crosslinks by entanglement. Properties can be adjusted by slightly higher peroxide dosage.

Comparing Therban AT with standard HNBR in a lot testing recipe

Lot testing recipe	1	2	3
HNBR1*	100		
HNBR 2**		100	
Therban AT***			100
IRB 7 (Carbon black)	40,0	40,0	40,0
IRM 91 (ZnO)	3,0	3,0	3,0
Rhenofit OCD	2,0	2,0	2,0
Vulkanox ZMB2/C5	0,4	0,4	0,4
Rhenofit TAC/S	2,0	2,0	2,0
Perkadox BC-40B-PD	10,0	10,0	10,0

Compound tests	1	2	3
Scorch MS-t3/140°C	7,3	8,0	9,7
Scorch MS-t5/140°C	9,0	9,9	13,2
Mooney ML1+4, 100°C	93,3	82,9	53,0
Rel. 30	7,4	6,3	2,8
MSR	0,5	0,6	0,7
MDR 180°C			
ts 01	0,4	0,4	0,5
t 10	0,5	0,5	0,6
t 50	1,3	1,3	1,4
t 90	3,4	3,2	3,4
t 95	4,4	3,9	4,2
S' min	1,8	1,6	0,8
S' max	19,7	17,8	14,7
MDR 160°C			
ts 01	1,1	1,2	1,8
t 10	1,7	1,8	2,2
t 50	6,6	6,9	7,8
t 90	17,8	18,1	19,0
t 95	21,6	22,0	22,7
S' min	2,0	1,8	0,9
S' max	20,2	18,8	15,1

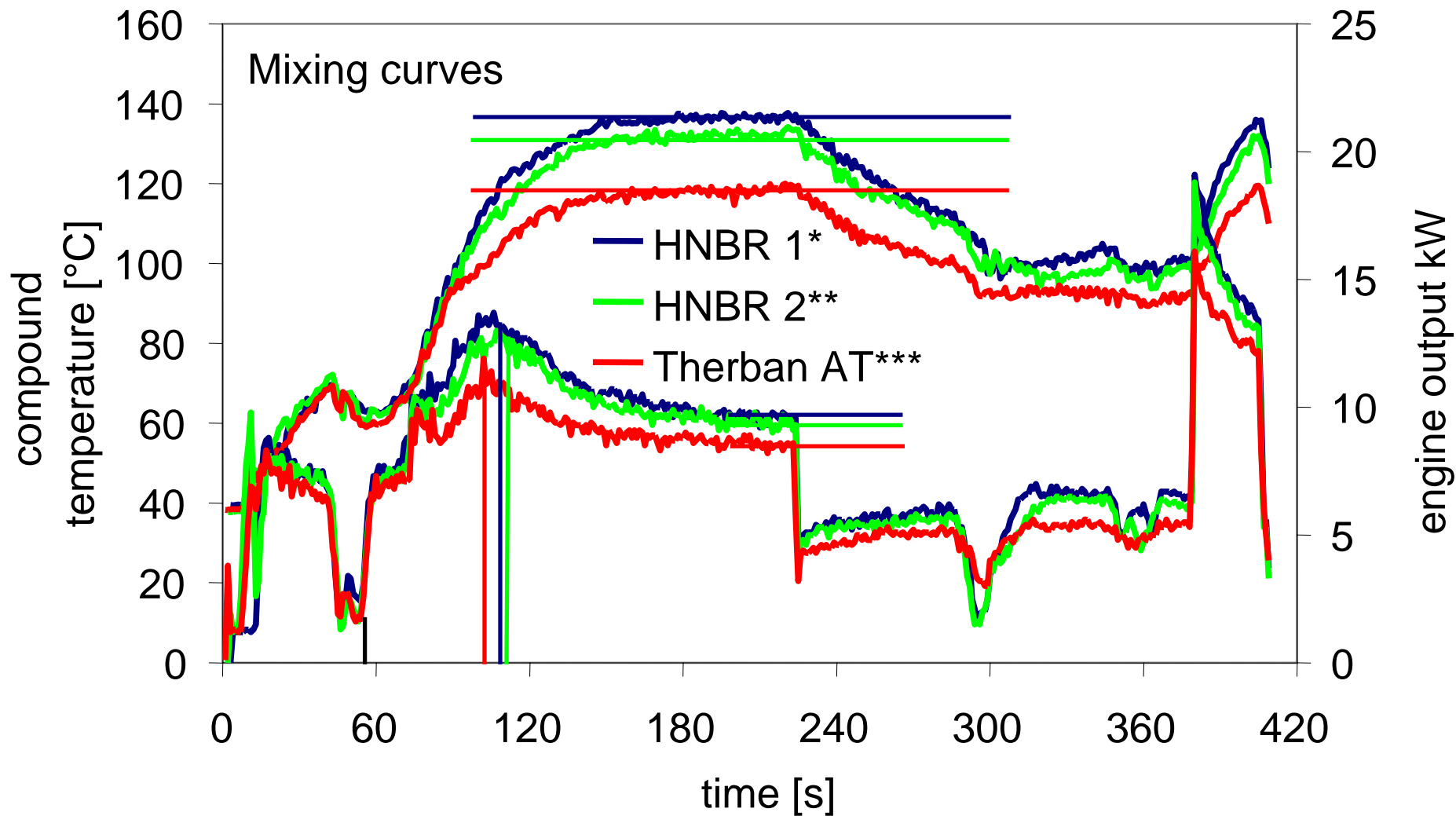
Vulcanizate tests	1	2	3
Tensile test			
Tensile strength	30,4	28,7	26,3
Elongation at break	354	349	394
M 50	1,4	1,4	1,3
M100	2,7	2,8	2,5
M150	6,1	6,2	5,2
M200	11,5	11,3	9,2
M250	17,7	17,2	13,7
M300	24,0	23,1	18,4
M350	29,9	28,7	22,8
Hardness 23°C	64,3	63,2	62,3
aging 7d / 150°C			
aged tensile test			
Tensile strength	27,1	27,1	24,6
Elongation at break	240	242	243
M 50	2,5	2,7	2,7
M100	6,5	7,0	6,6
M150	13,2	13,7	12,6
M200	20,9	21,1	19,2
M250	28,6	27,5	25,4
aged hardness 23°C	74,0	75,0	75,0

* Standard 34 ACN / ML 70

** Standard 34 ACN / ML 60

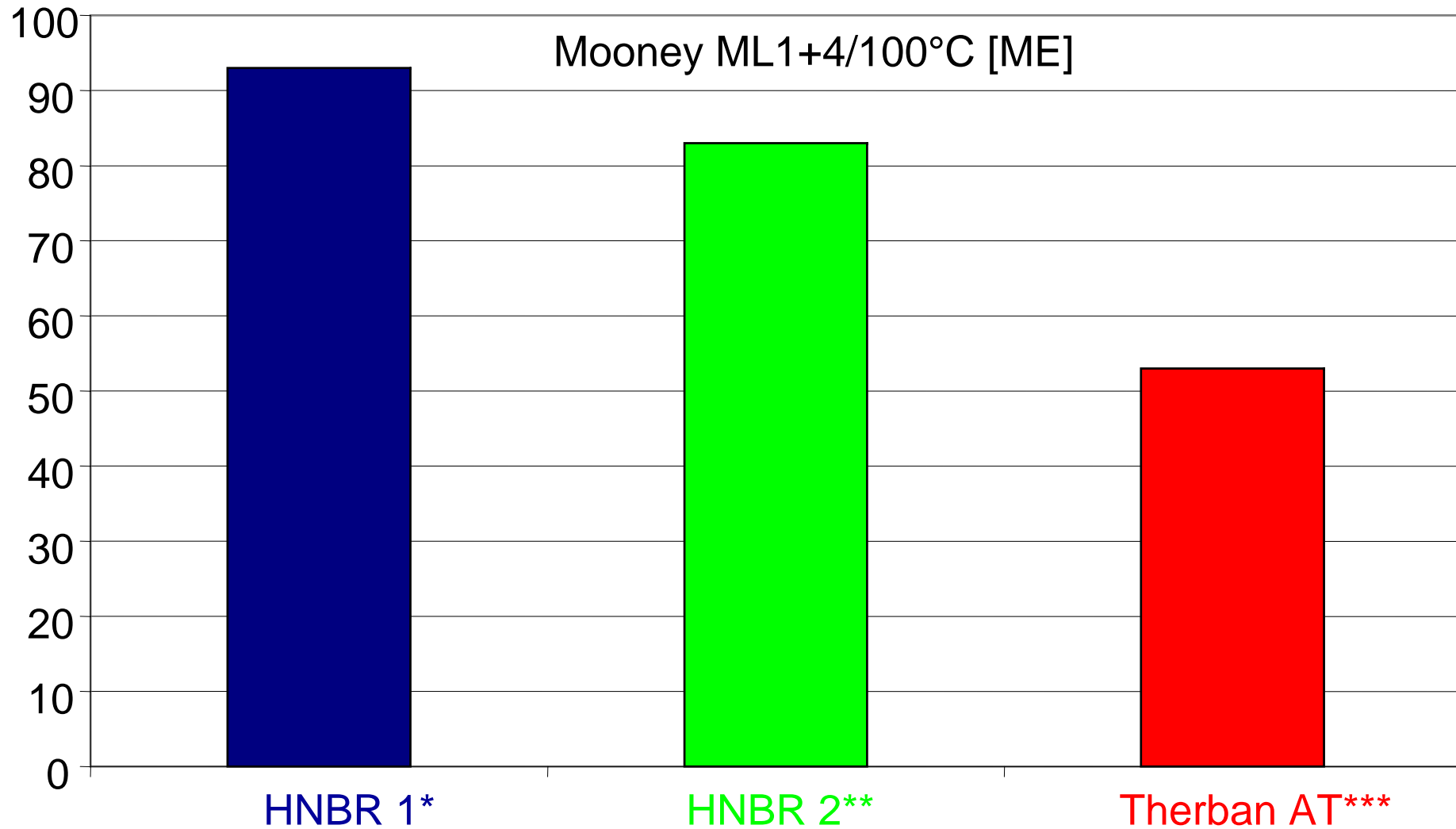
*** Therban AT VPKA 8966 (34 ACN / ML 39)

Mixing



* Standard 34 ACN / ML 70 ** Standard 34 ACN / ML 60 *** Therban AT VPKA 8966 (34 ACN / ML 39)

Compound viscosity

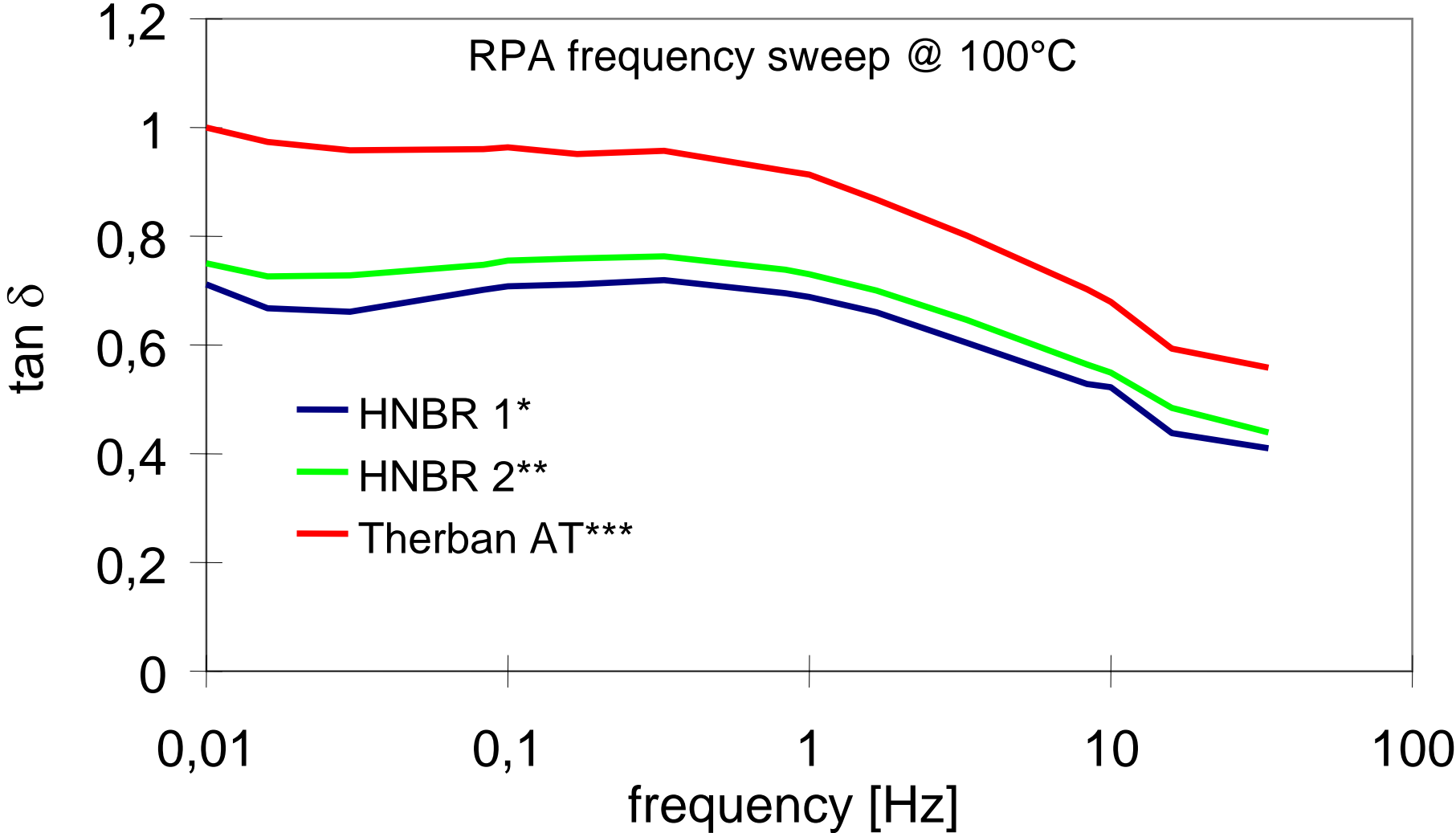


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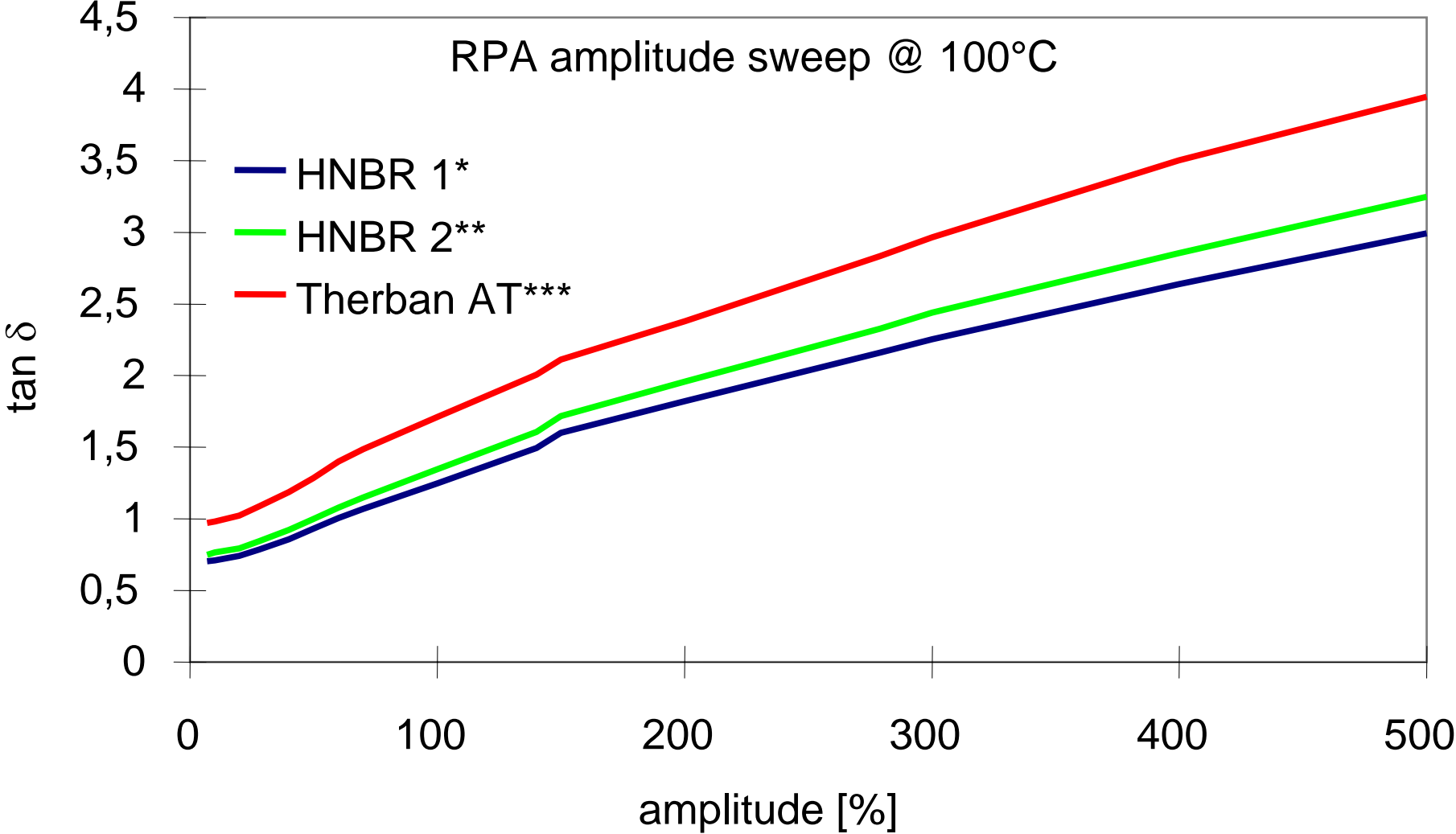
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RPA measurement of compound



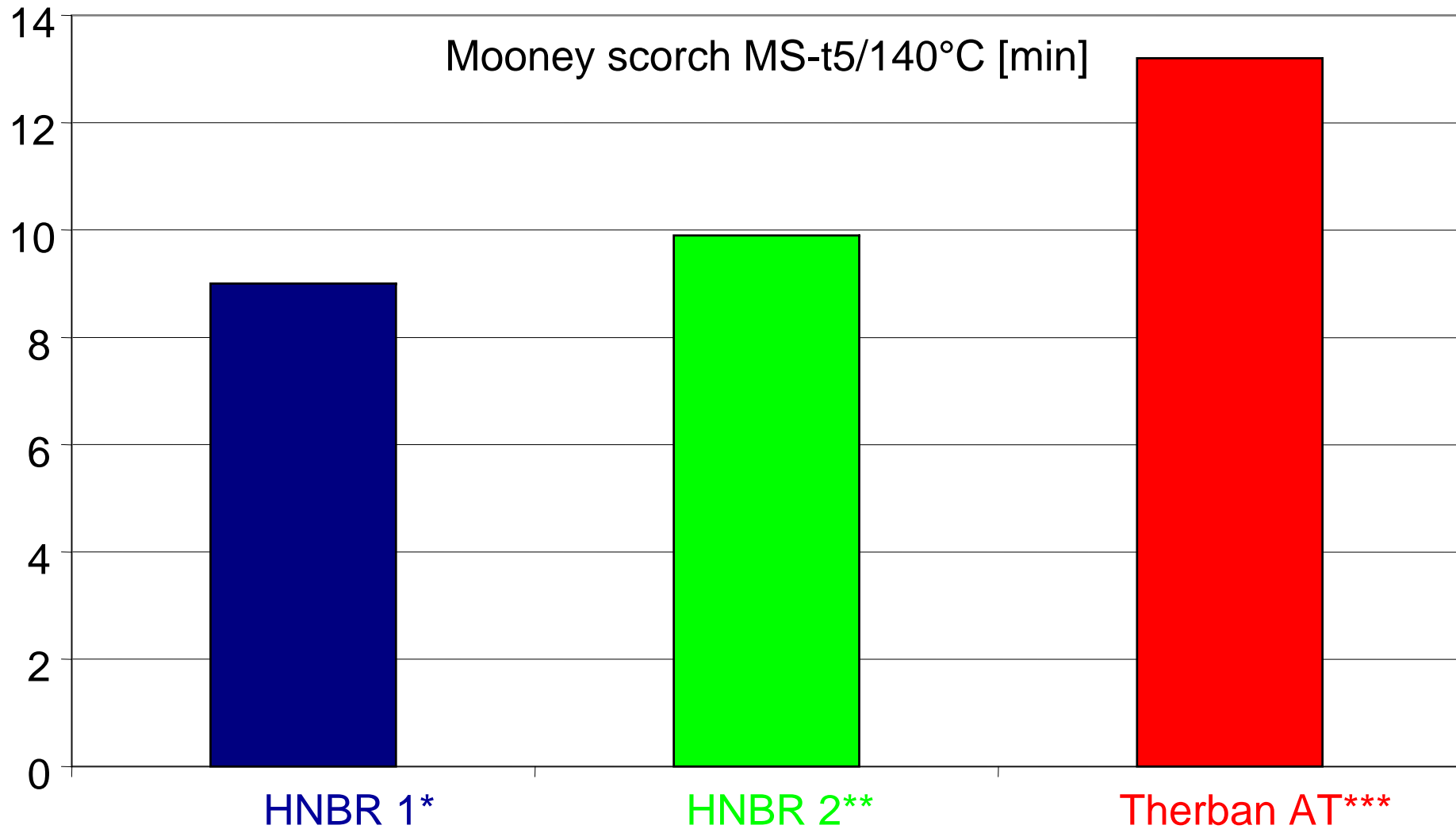
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RPA measurement of compound



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Scorch resistance

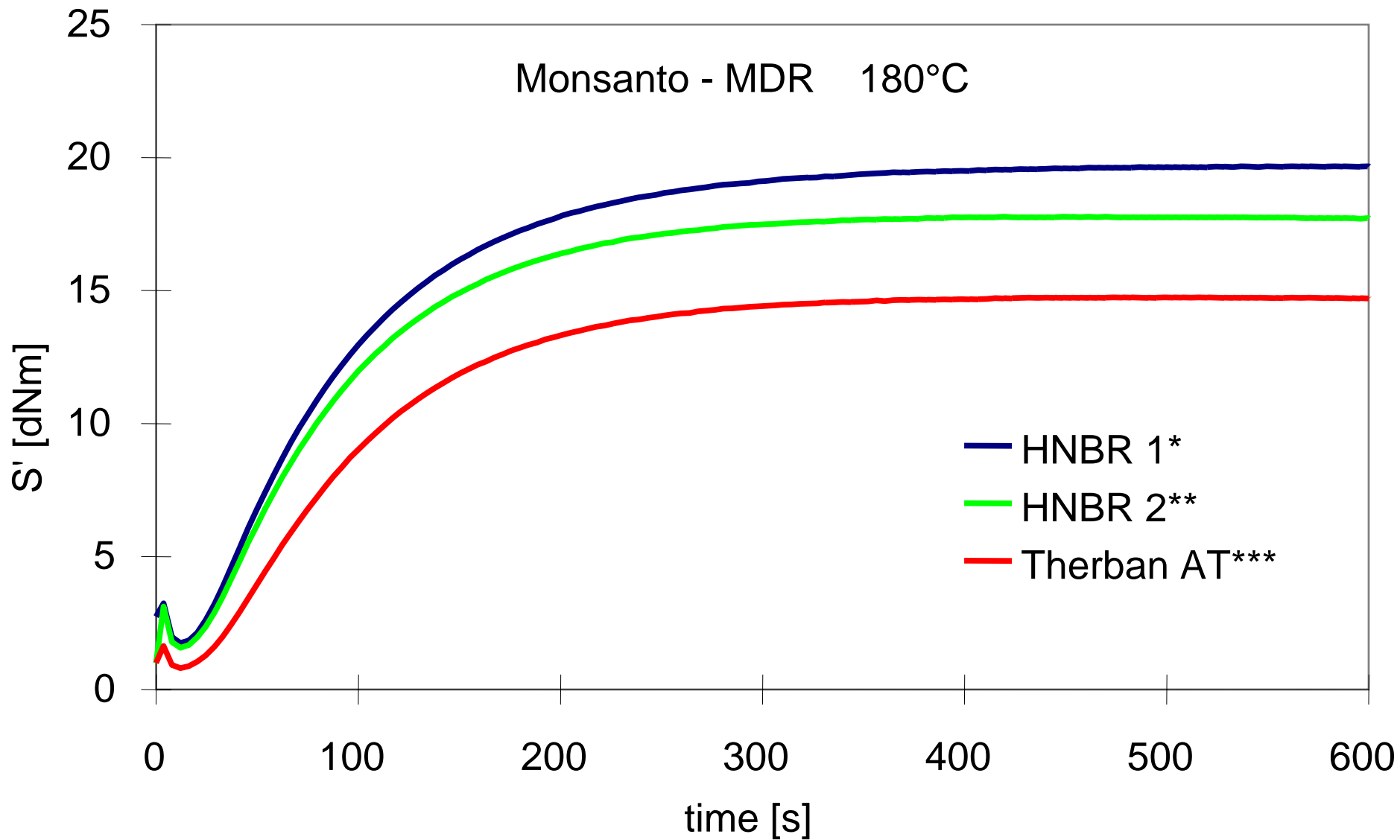


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Vulcanization

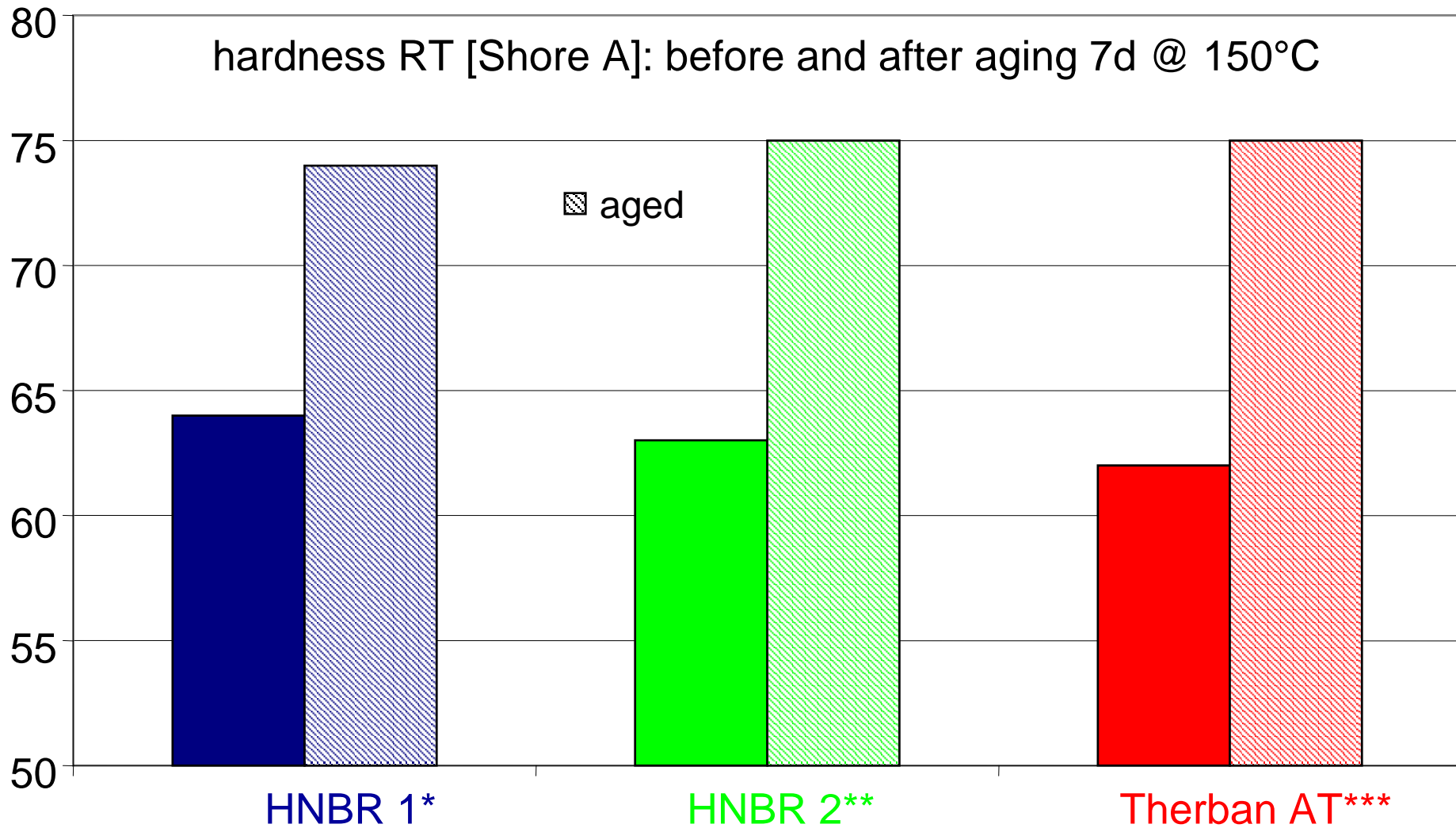


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Hardness

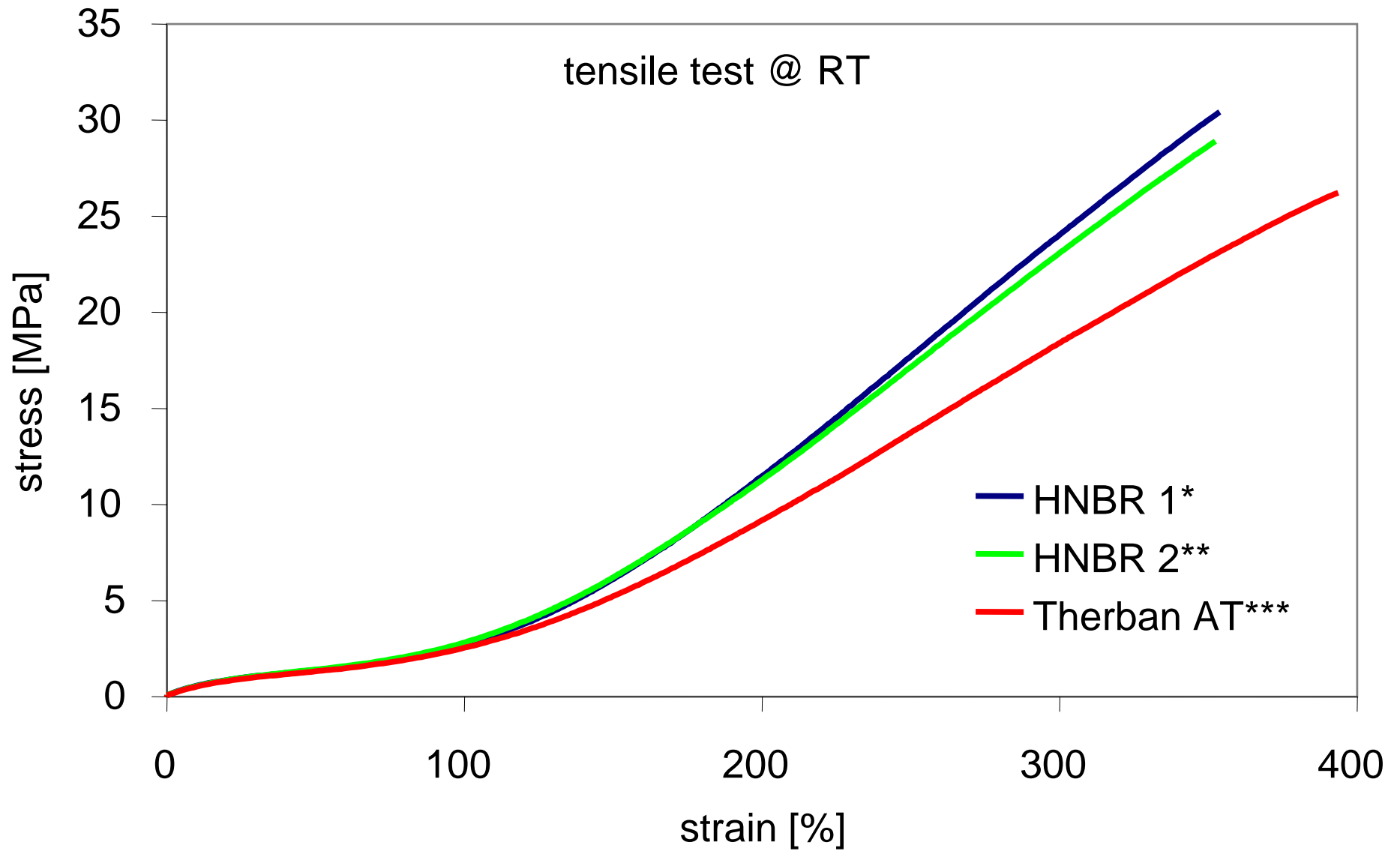


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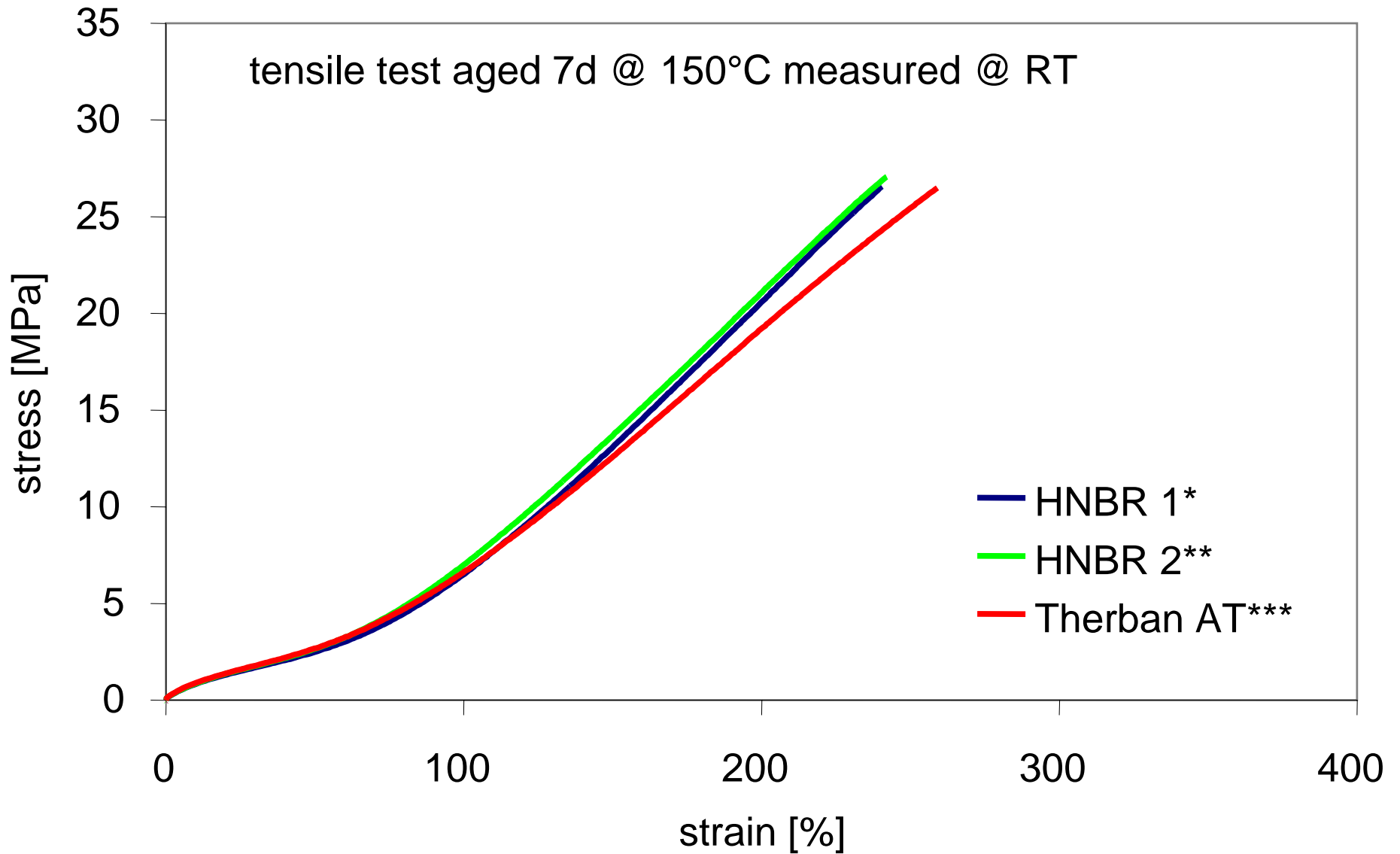
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Tensile test



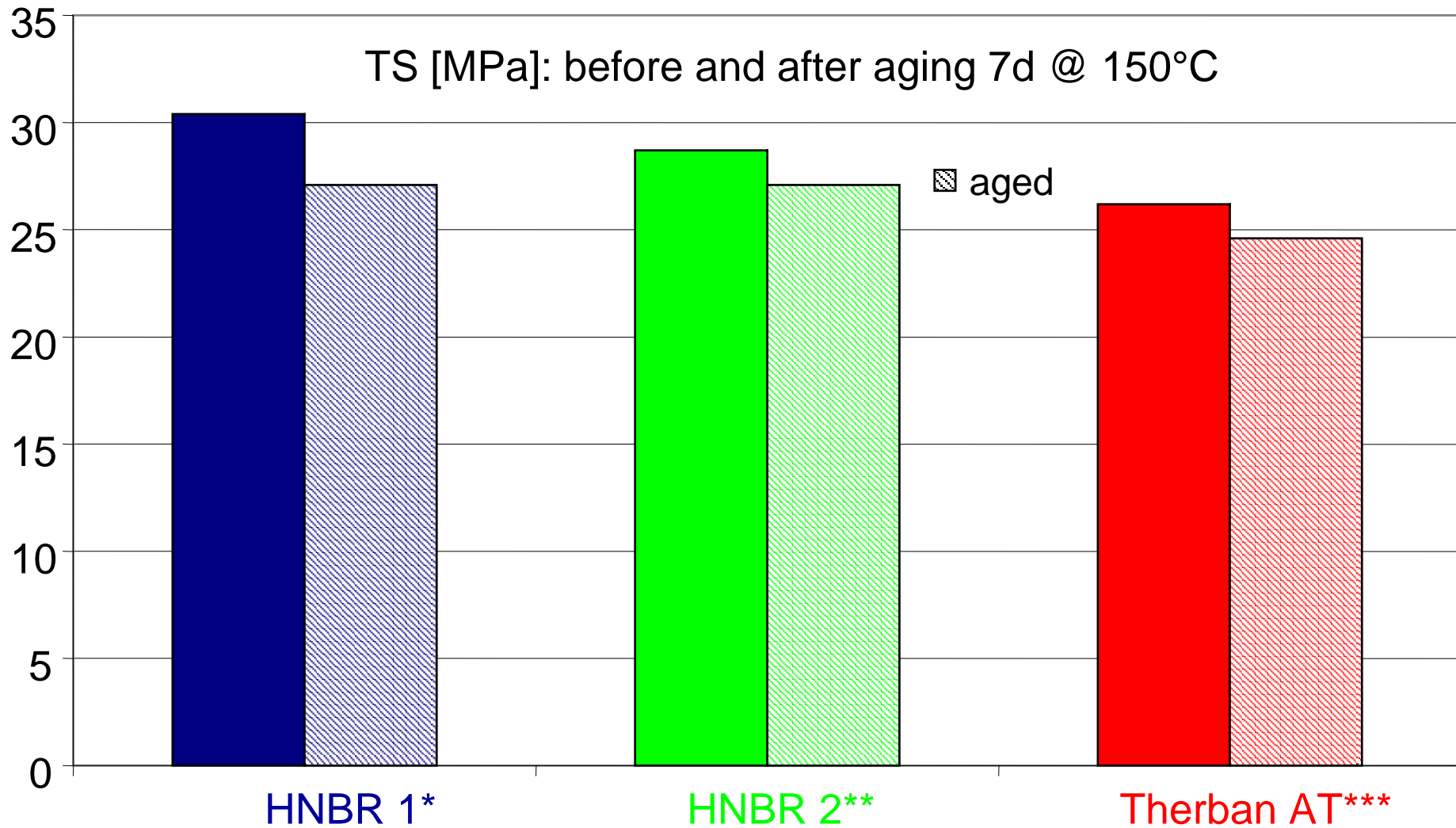
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Tensile test



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Tensile strength

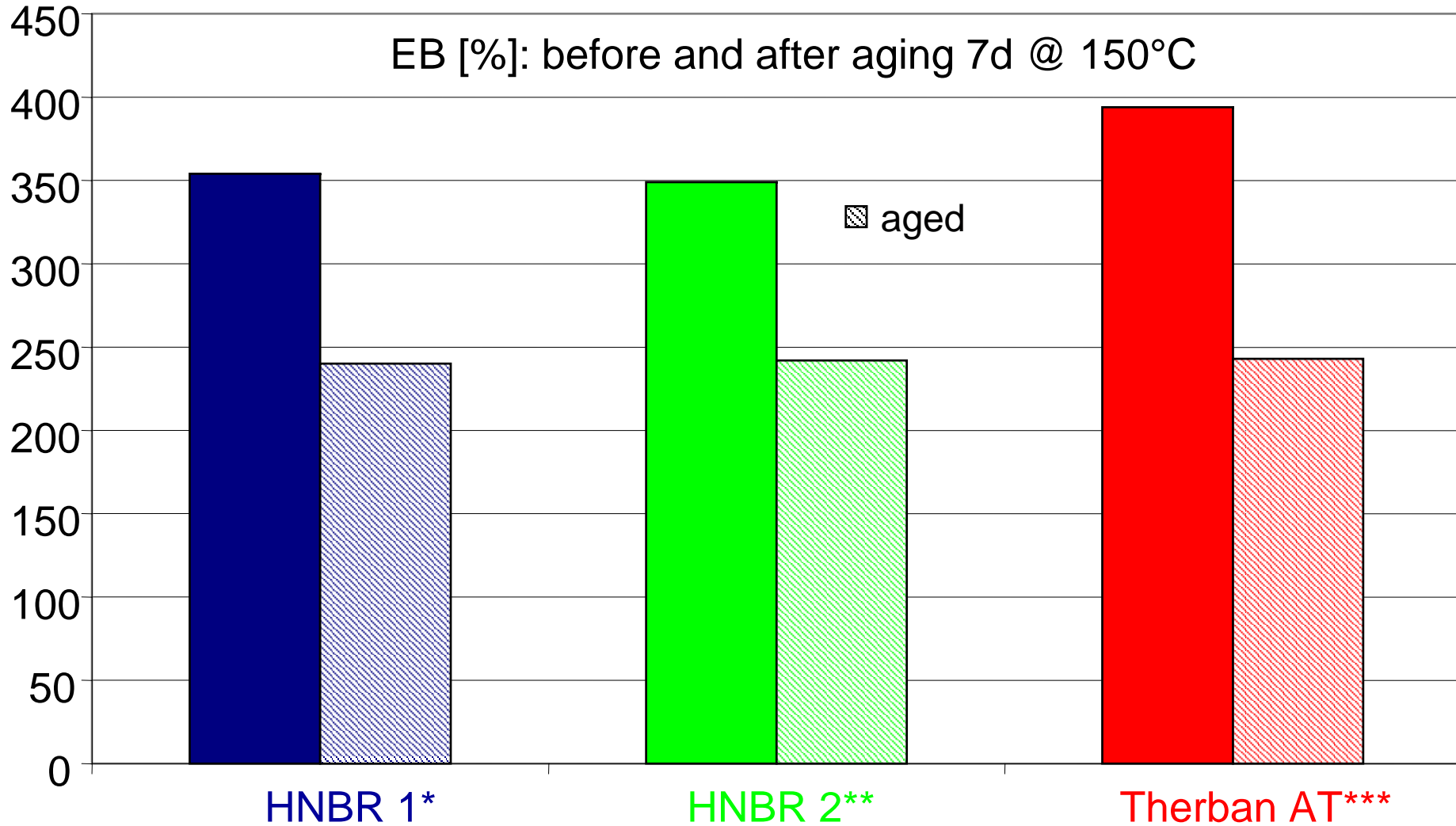


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Elongation at break

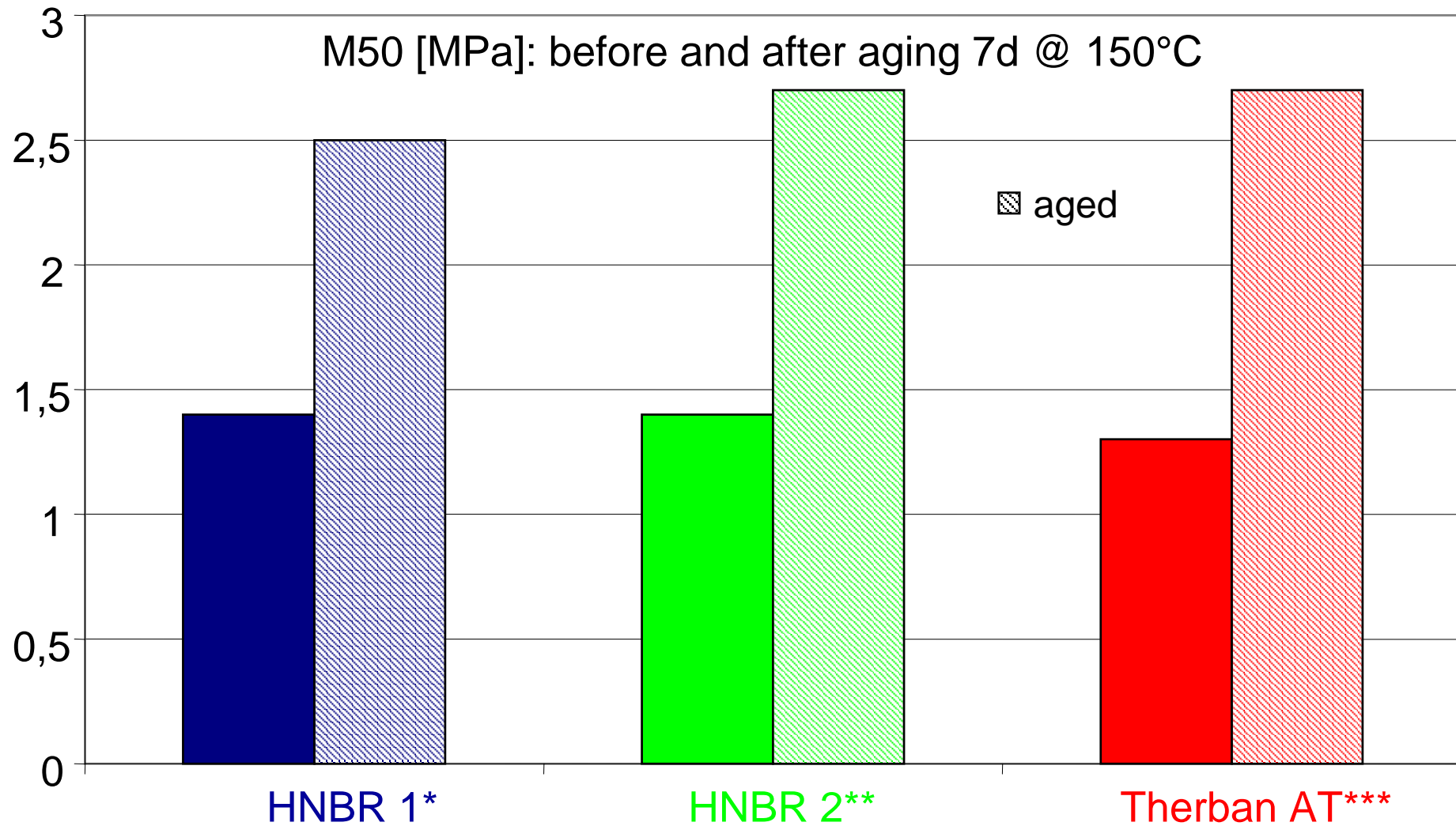


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Modulus



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