

NEUBURG SILICEOUS EARTH (SILFIT Z 91) AS TITANIUM DIOXIDE EXTENDER IN TiO₂ SLURRY, E.G., FOR LATEX THREADS

INTRODUCTION

Addition of calcined clays as a slurry to white pigmented latex for titanium dioxide extension is often found in the industry. The calcined clay slurry production requires a lot of time-consuming effort, often causing problems in rheology and sedimentation stability.

The Calcined Neuburg Siliceous Earth grade Silfit Z 91 exhibits a property profile which offers itself as an alternative to calcined clay with new capabilities.

OBJECTIVE

Exploiting the unique property profile of Silfit Z 91 as a partial replacement of titanium dioxide in a **direct addition process into the titanium dioxide slurry** for latex threads, thus avoiding the effort of preparing a separate slurry as done with regular calcined clay.

CALCINED NEUBURG SILICEOUS EARTH: SILFIT Z 91

• High brightness • High color neutrality • Low particle size • Very low sieve residues • Excellent dispersion properties • Improved pigment dispersion by „spacer-effect“ likewise exploiting this effect for partial TiO₂ replacement	Color L*		95
	Color a*		-0.1
	Color b*		1
	Particle size d ₅₀	[µm]	2.0
	Particle size d ₉₇	[µm]	10
	Oil absorption	[g/100g]	55
	Sieve residue >40 µm	[mg/kg]	10
	Specific surface area BET	[m²/g]	7.0
	Density	[g/cm³]	2.6

TiO₂ SLURRY

INTRODUCTION

	Control TiO ₂ Slurry	10 % TiO ₂ replaced by Silfit Z 91	20 % TiO ₂ replaced by Silfit Z 91
Water demineralized	27.5	27.5	27.5
DMA (40% in water)	2.5	2.5	2.5
Titanium dioxide, Anatas (Kronos 1001)	70	63	56
Silfit Z 91	-	7	14
Total	100 %	100 %	100 %

OBJECTIVE

Batch size	• Total quantity 500 g
Mixing and Dispersing	• Premixing of water and DMA with dissolver equipped with • smooth teflon disc 7.5 cm Ø in • 1 litre stainless steel vessel 10.5 cm internal Ø (APS 1000, VMA-Getzmann) • Addition of TiO₂ or TiO₂ +Silfit Z 91 respectively • Addition of 400 ml glass beads (2 mm Ø) • Grinding at 2000 rpm (= 7.9 m/s tip speed) under water cooling of vessel • Grinding time 5, 10, 15, 20 minutes, the latter was used for preparing the latex batch



LATEX BATCH WITH TiO2 SLURRY

FORMULATION

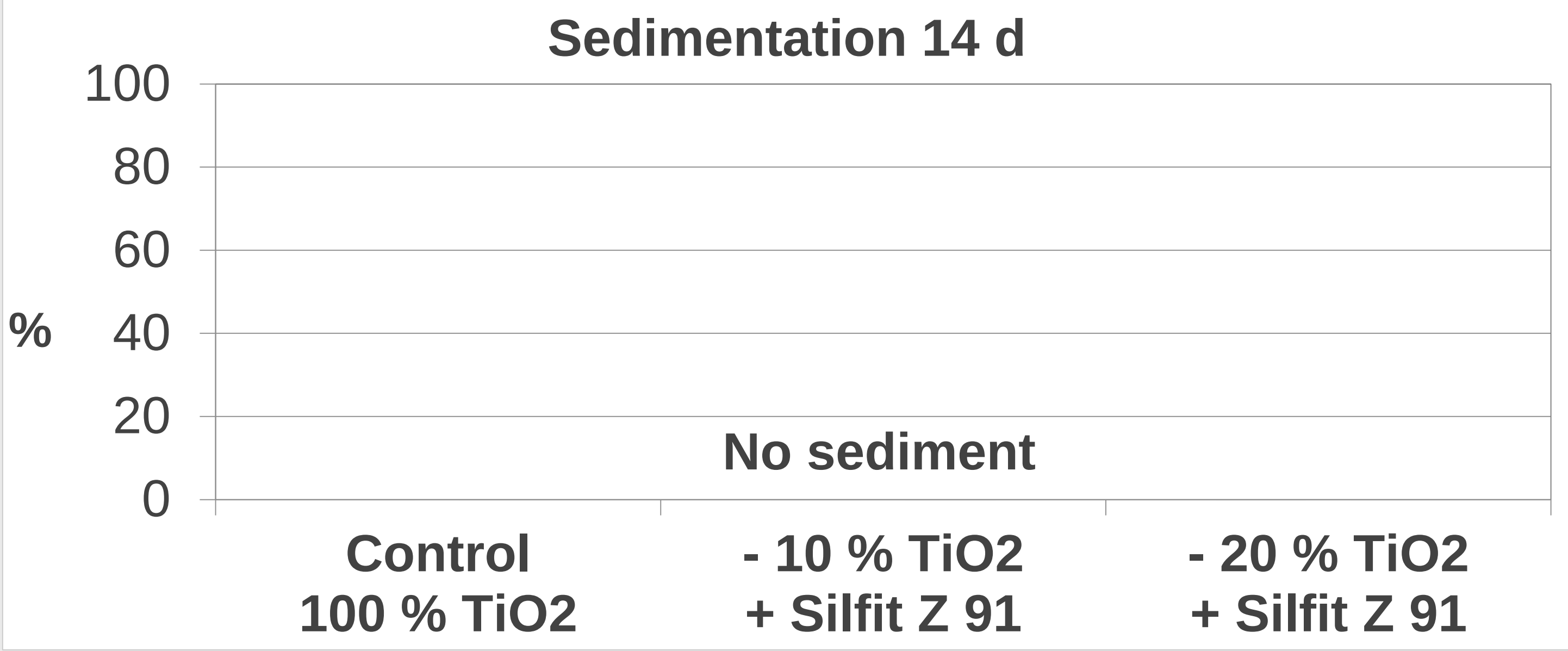
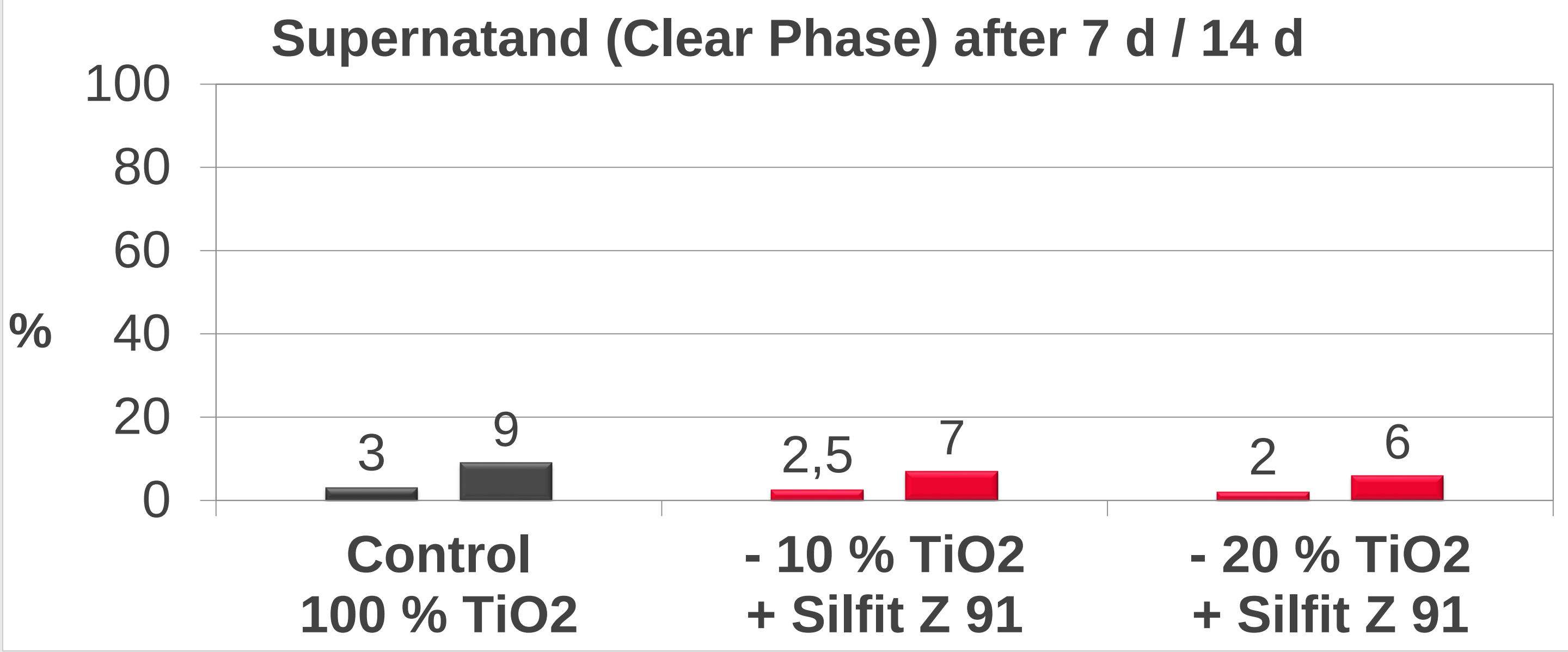
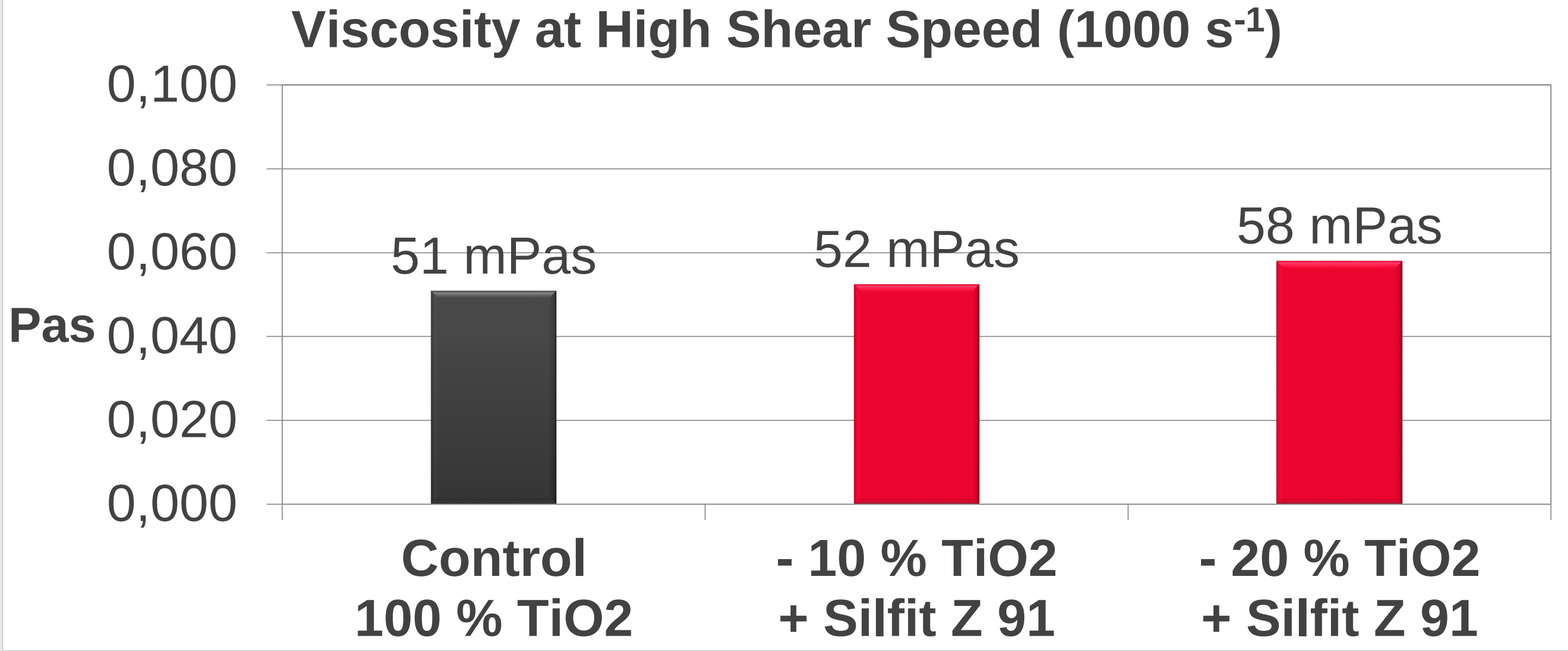
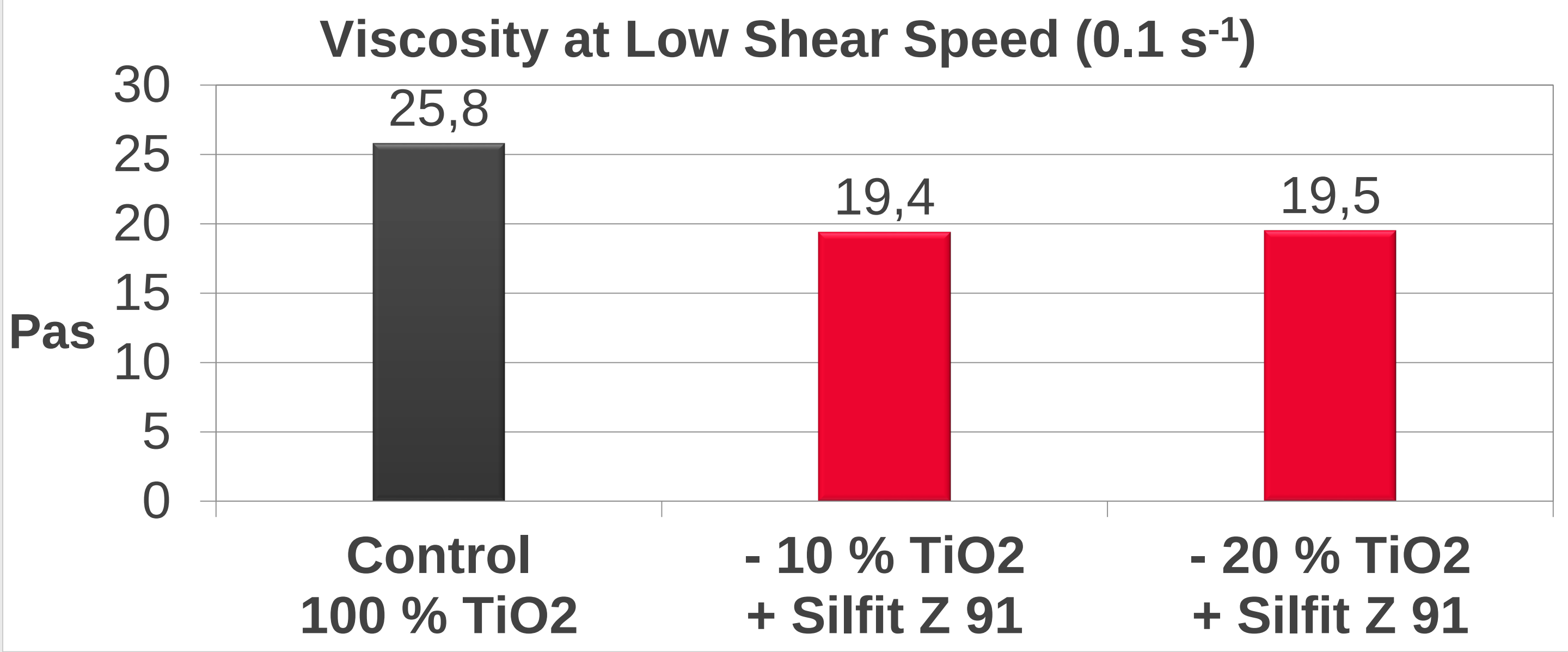
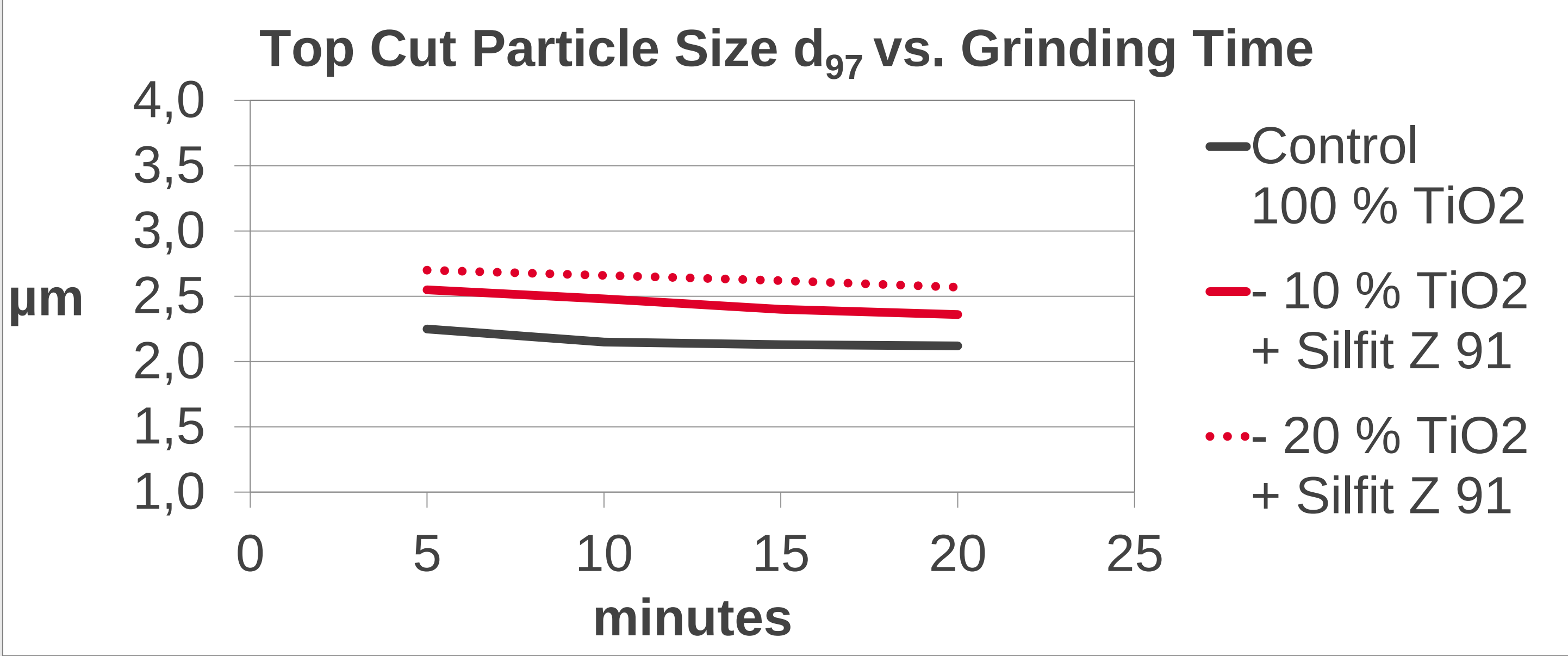
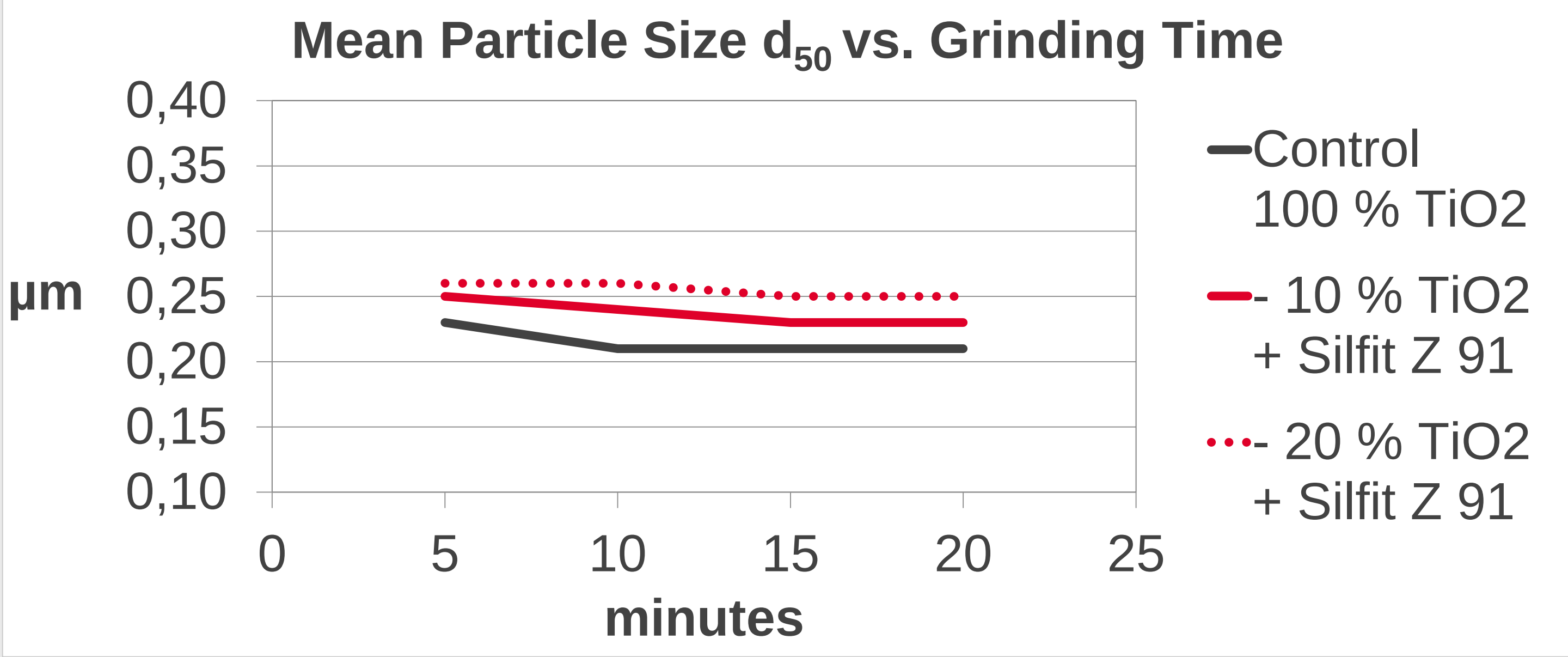
	All formulations
NR-latex, 60 % solids, low ammonia	70
TiO ₂ Slurry (Silfit Z91 included)	30
Total	100 %

PREPARATION

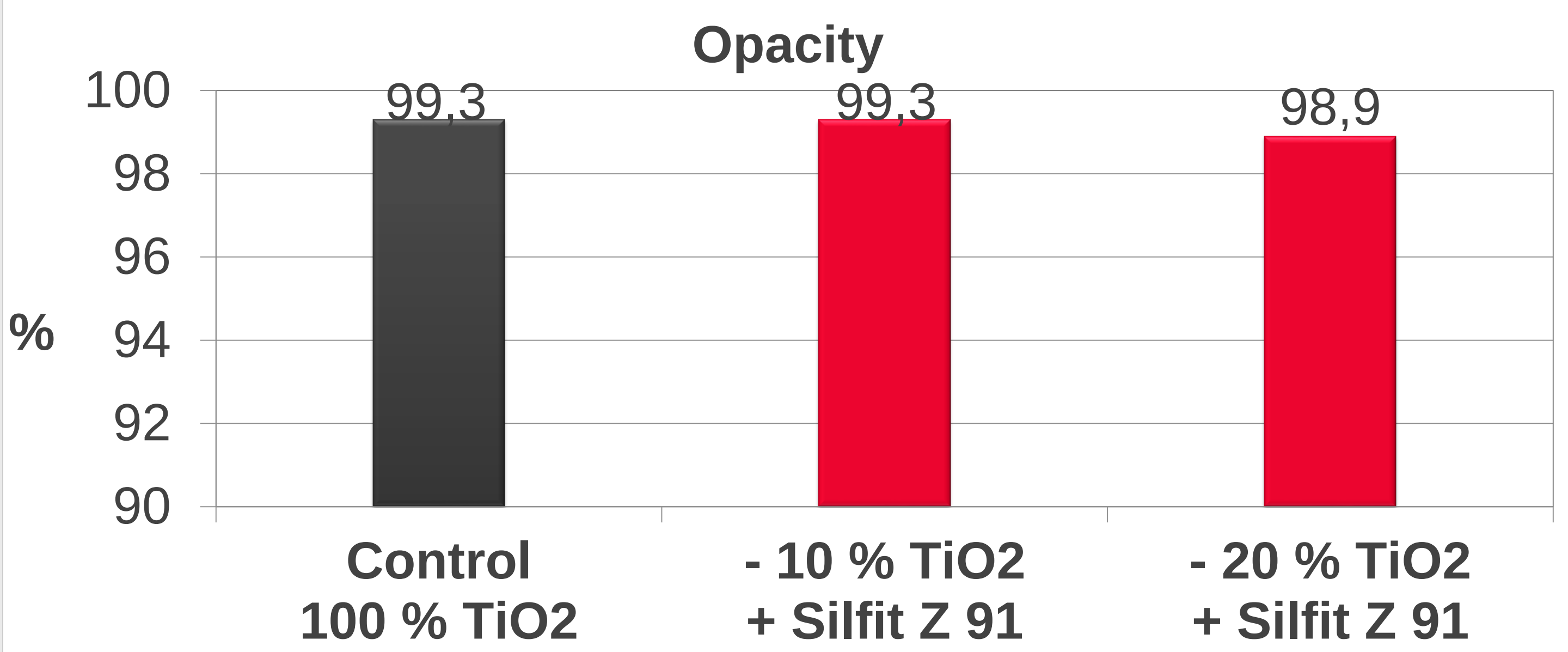
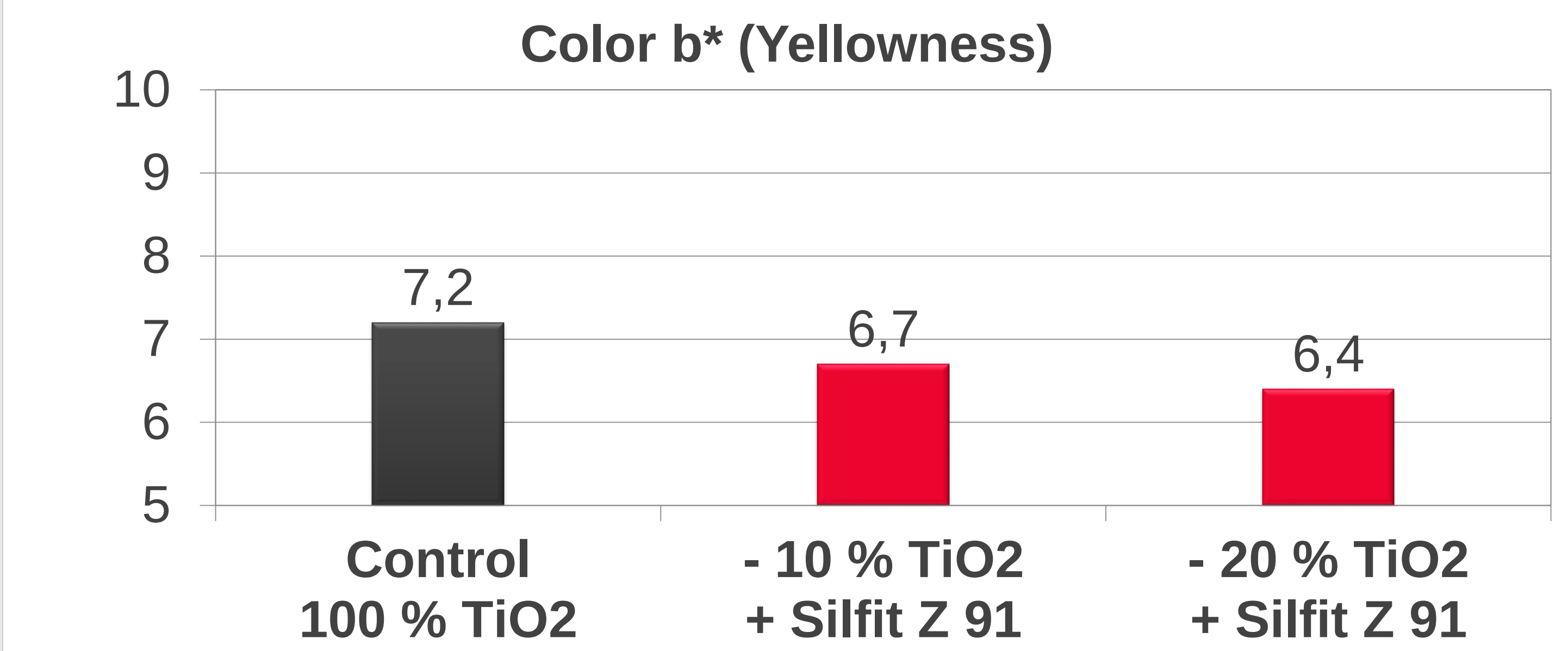
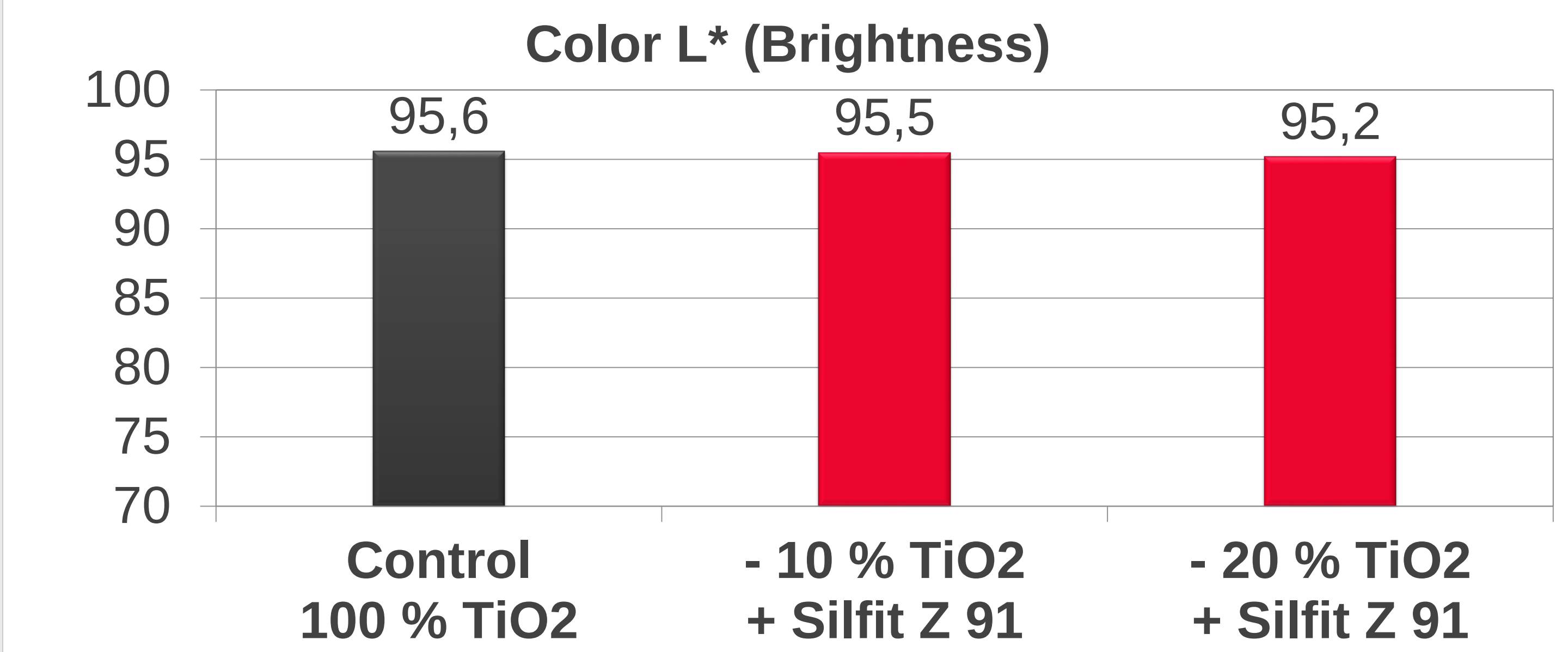
- Mixing by a stirrer, three blade propeller type, diameter 4 cm
- Stirrer velocity: 550 rpm during addition of TiO₂ slurry for 3 min
750 rpm for homogenation/mixing for 10 min
- Applying the latex batch on contrast boards (checkerboard style) with a 4 sided film applicator
- Let dry for 18 h at ambient conditions before testing
- Dry film thickness 210 to 220 µm

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TiO₂ SLURRY RESULTS



LATEX BATCH WITH TiO₂ SLURRY RESULTS



The replacement of 10 to 20 % of titanium dioxide by Silfit Z 91 results in:

Improved Features

- + tremendous reduction of effort due to no preparation of separate slurry
- + reduction of yellow tint of the pigmented latex
- + cost reduction

Retained Features

✓dispersion, viscosity, sedimentation, color, opacity