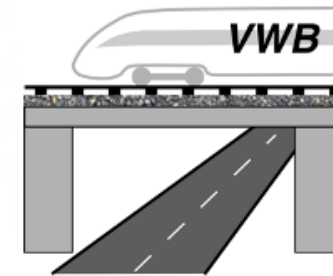
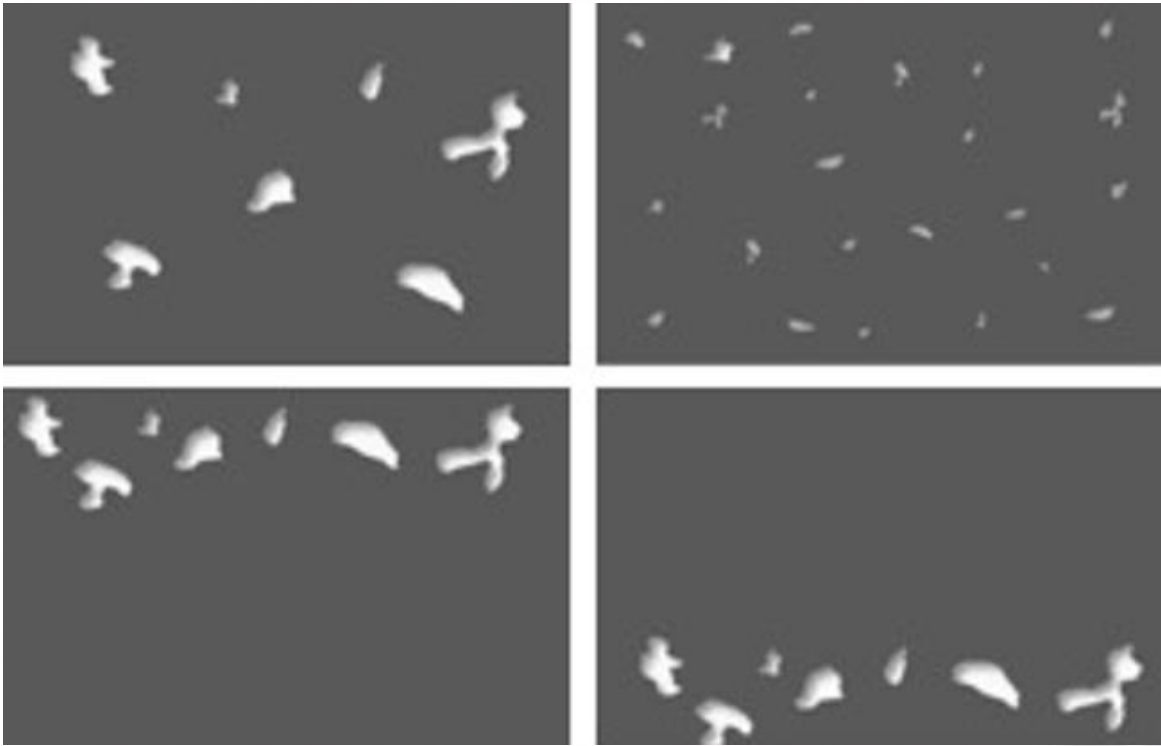


Ermittlung und Parametrisierung der Hohlraumverteilung in Asphaltprobekörpern mit asphaltpetrologischen Methoden

Dr.-Ing. Stefan Böhm
Technische Universität Darmstadt
Institut für Verkehrswegebau





Gleicher Hohlraumgehalt,
Aber unterschiedliches Materialverhalten zu
erwarten

Hohlräume in Asphaltkörpern können
verschieden verteilt sein

TP Asphalt-StB Teil 8 kann diese
Unterschiede nicht bestimmen

Ziel des Projekts:

Entwicklung einer bildgebenden
Methode zur Analyse der
unterschiedlichen Hohlraumgefüge

Konventionelle Steintrennmaschine



35 x 12,6 mm



7,4 x 3,7 mm

Präzisionstrennmaschine



35 x 12,6 mm

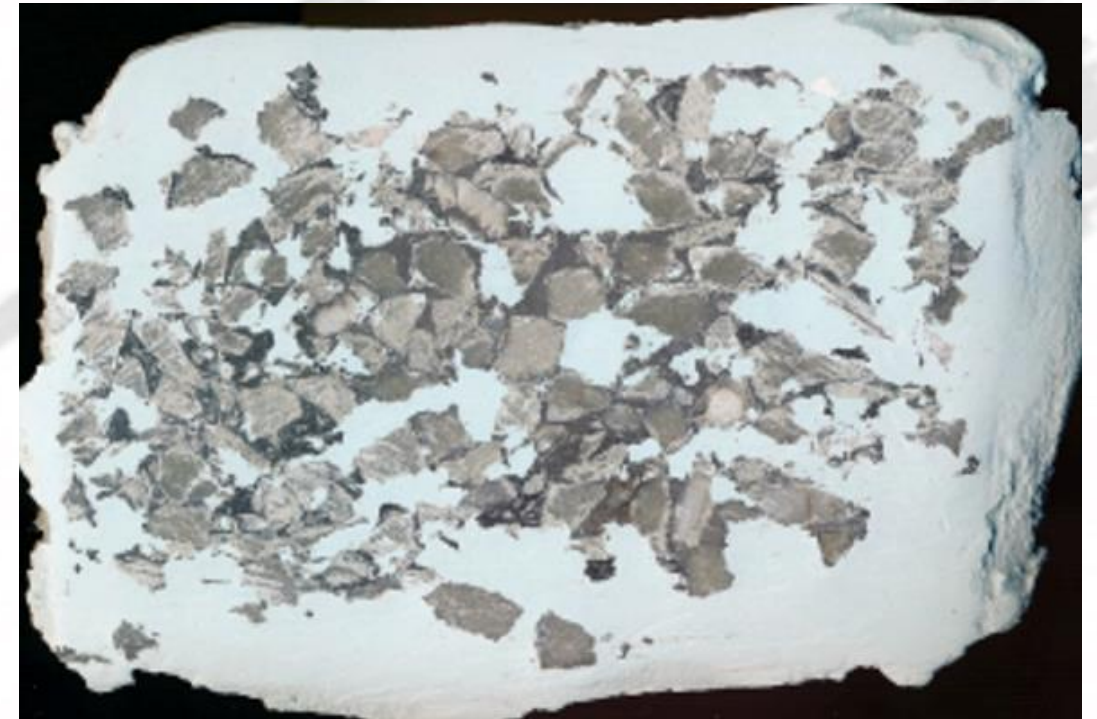


7,4 x 3,7 mm



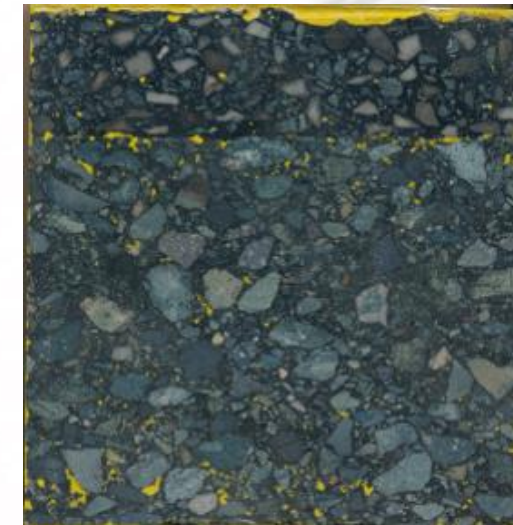
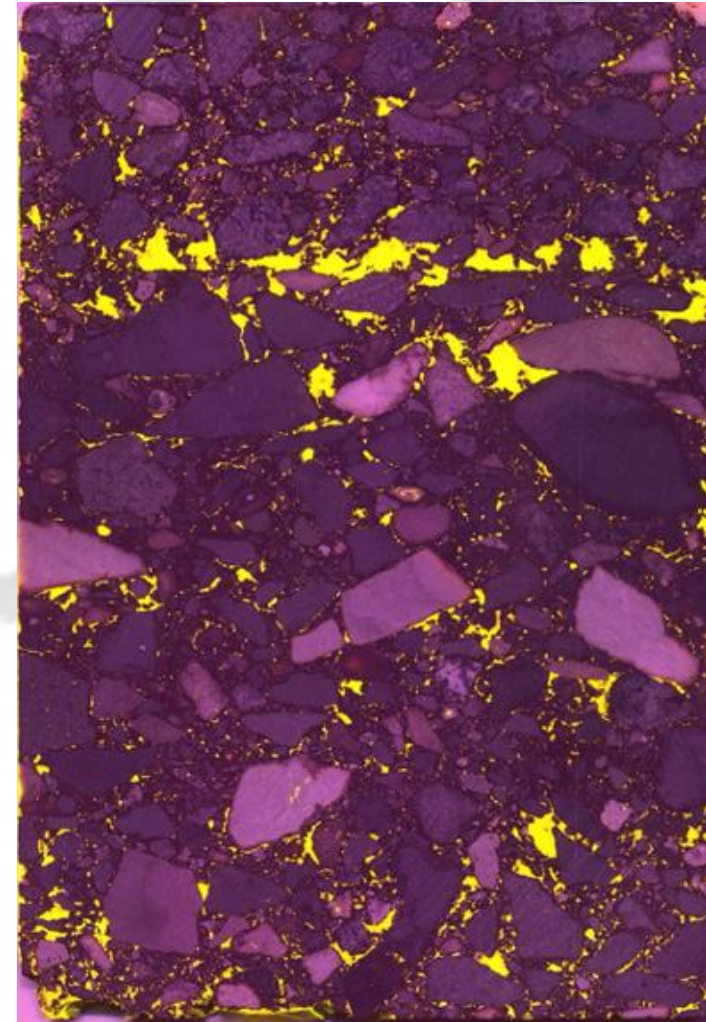


Gips

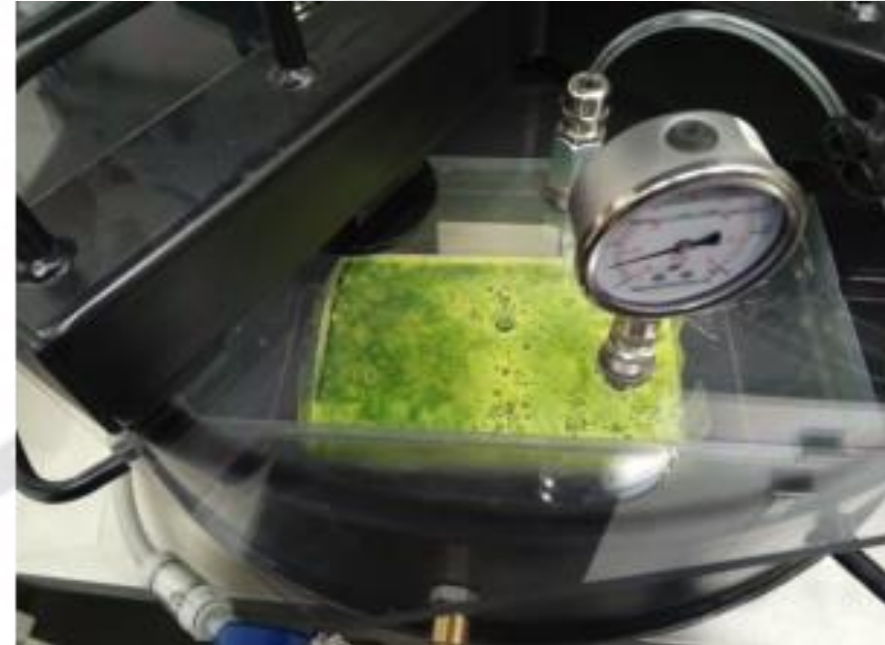


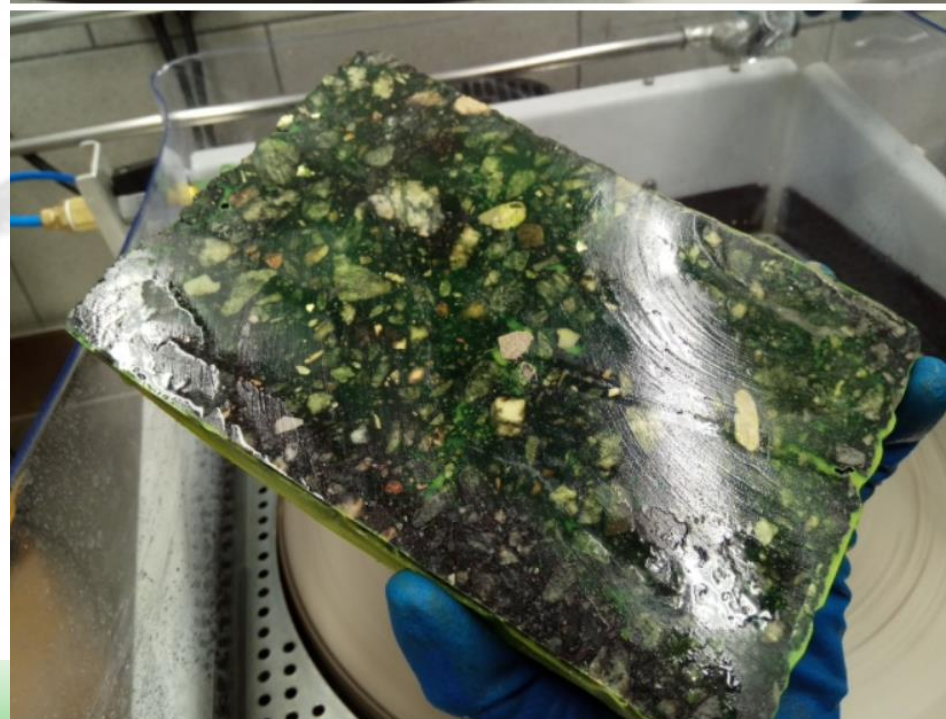
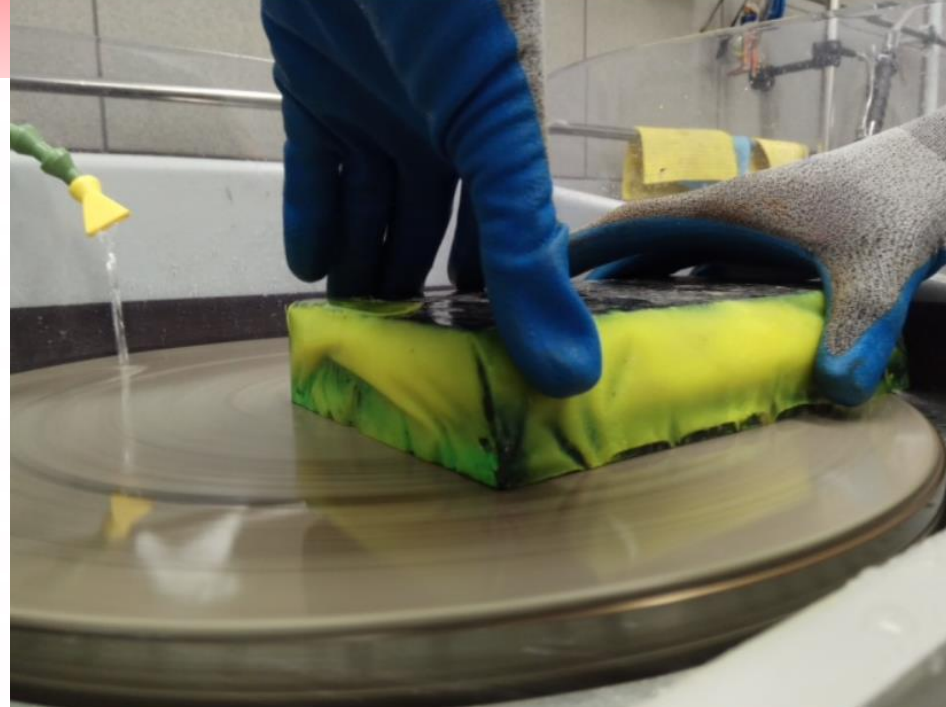
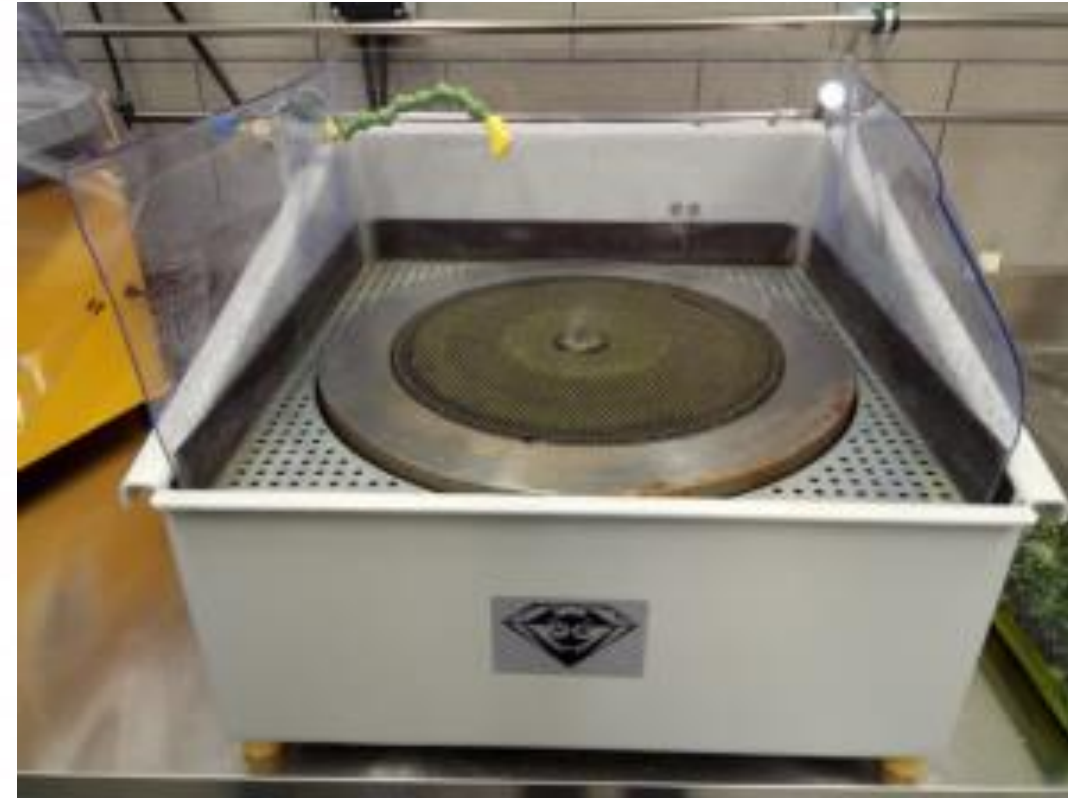
→ Nicht geeignet!

Epoxidharz

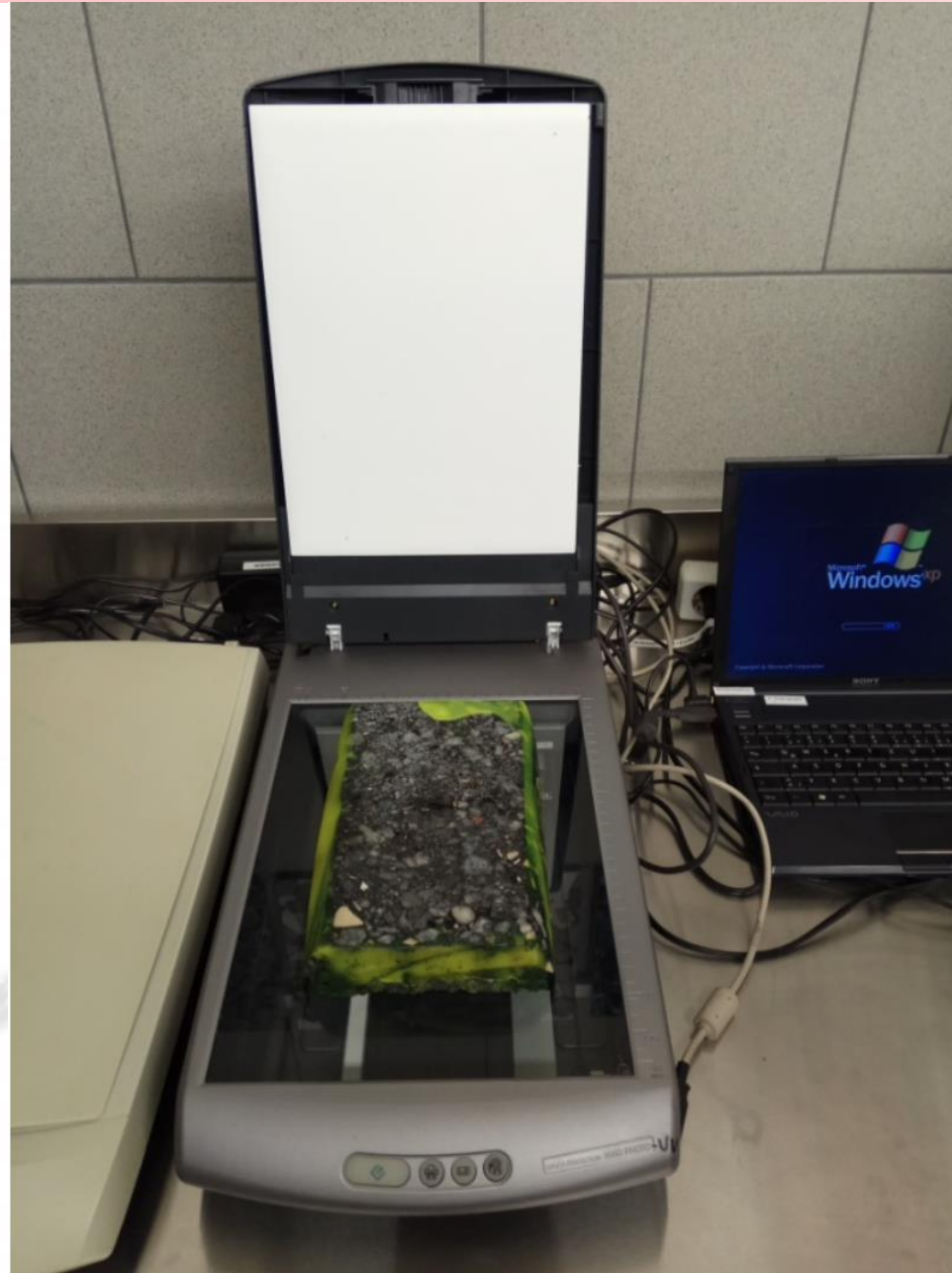


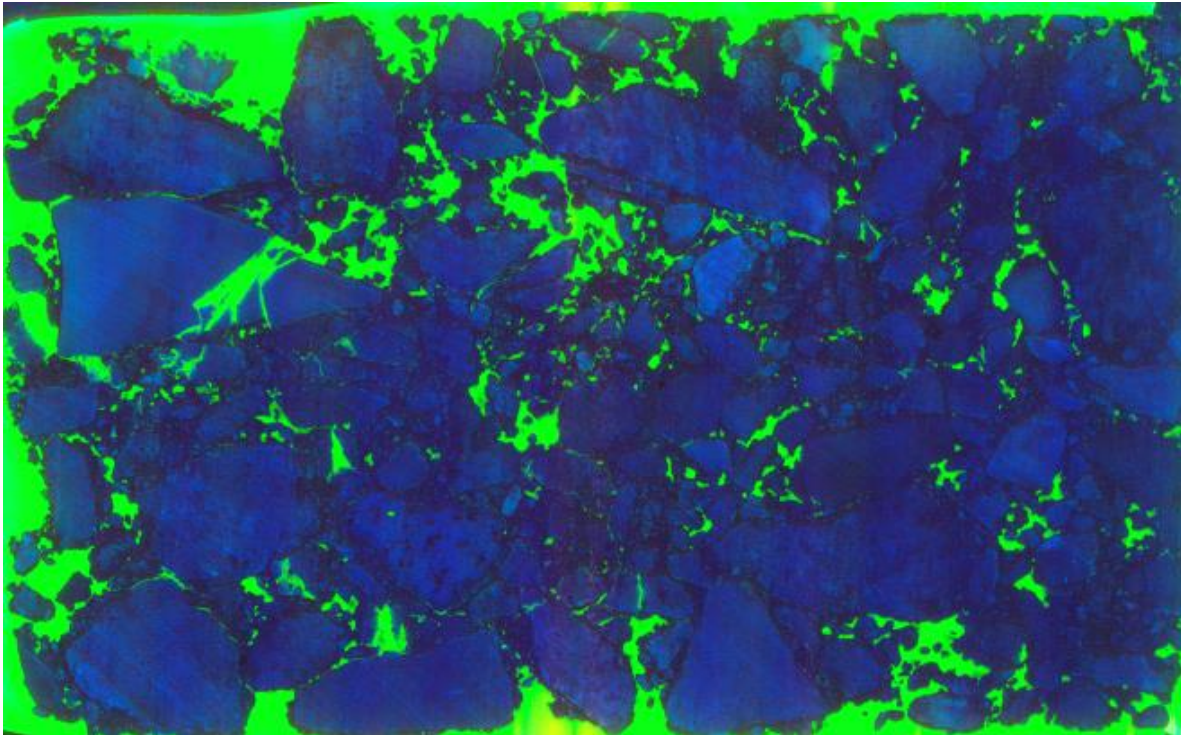
→ Geeignet!





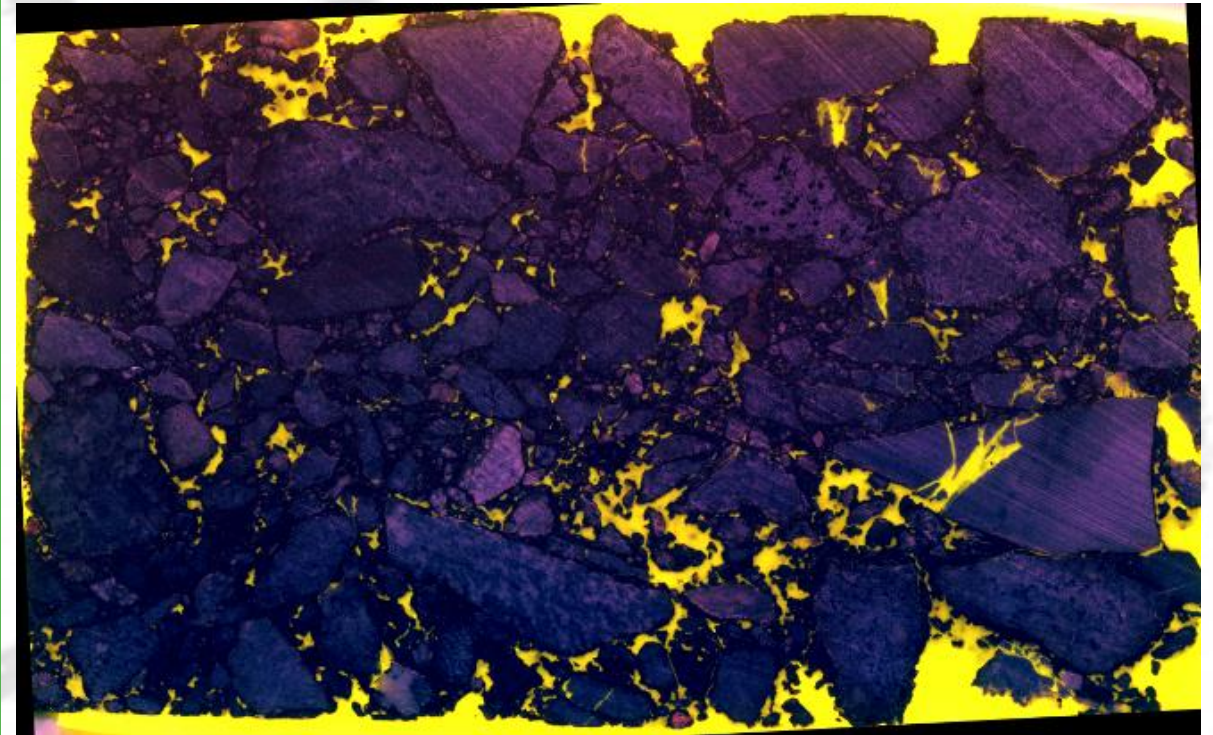
Schleifen mit Rotationsteller
effektiver als Vibrationstisch





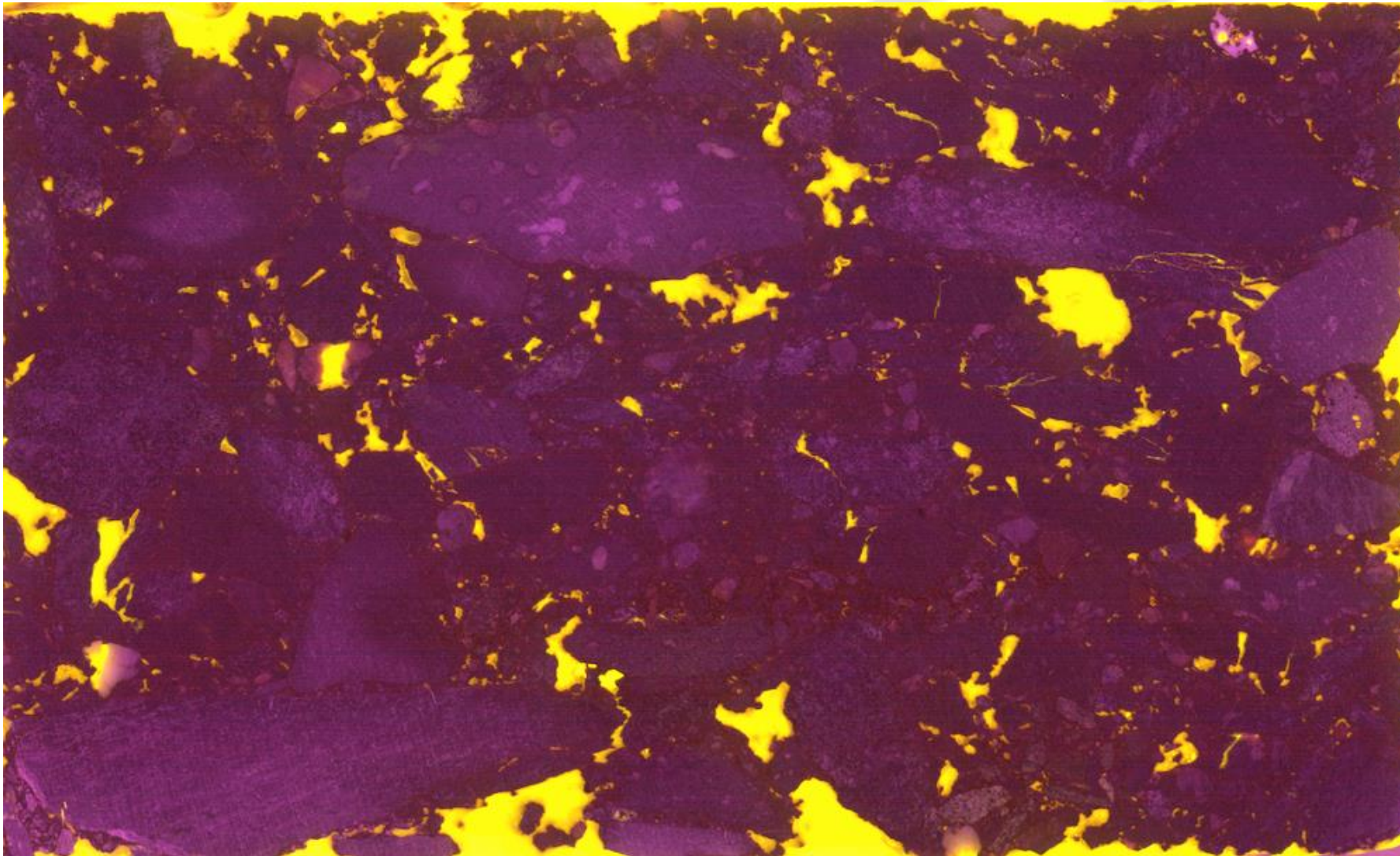
Kaltlichtröhrenscanner

- Veraltetes System
- Geringere Lichtausbeute



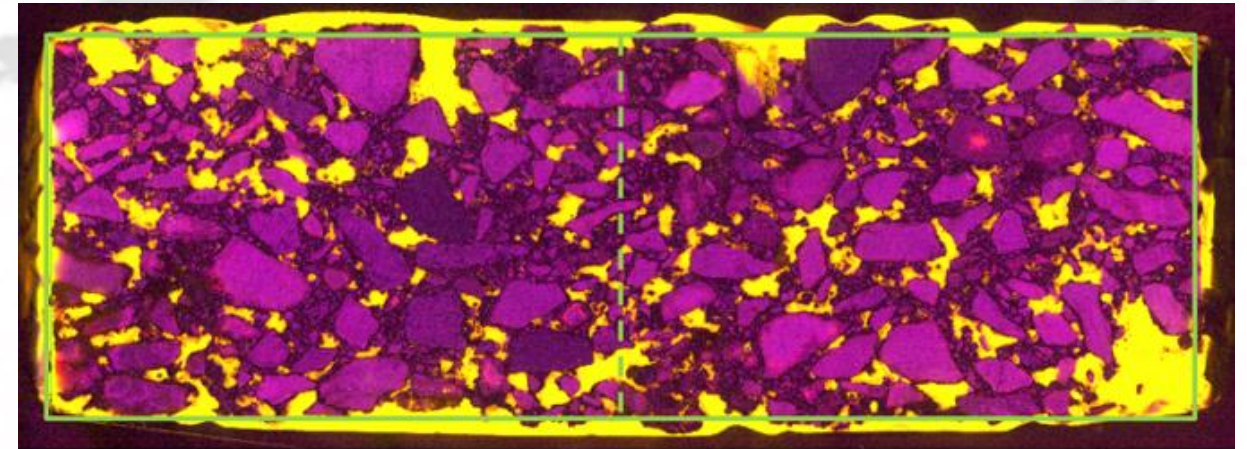
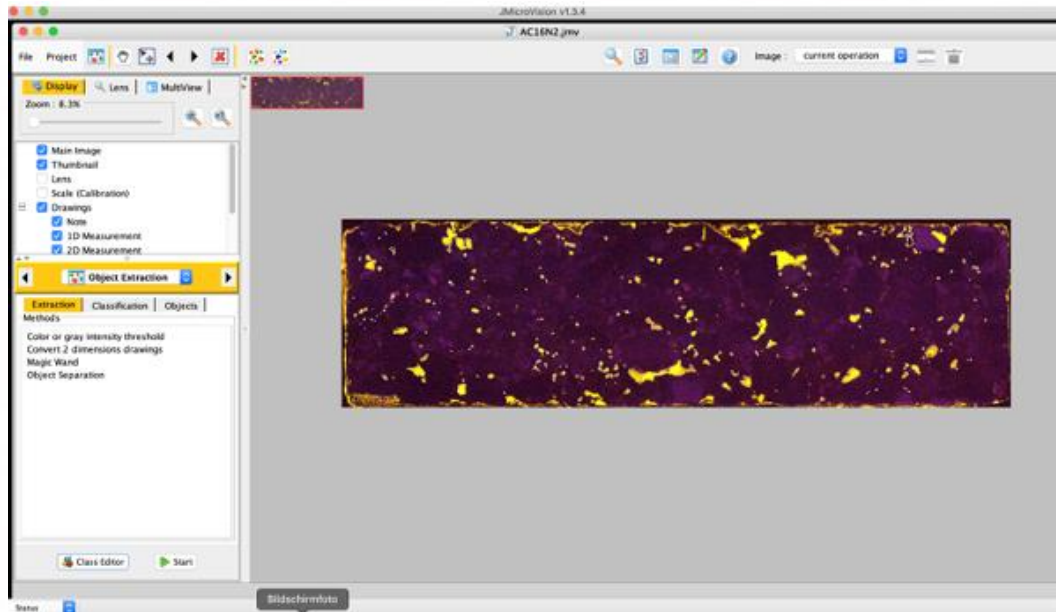
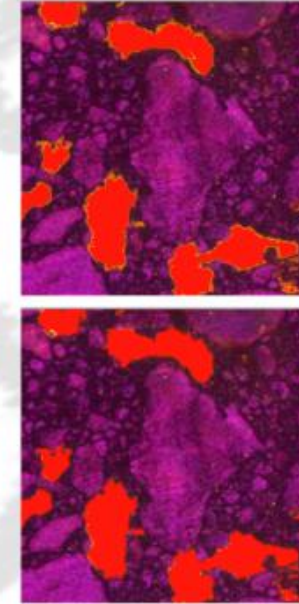
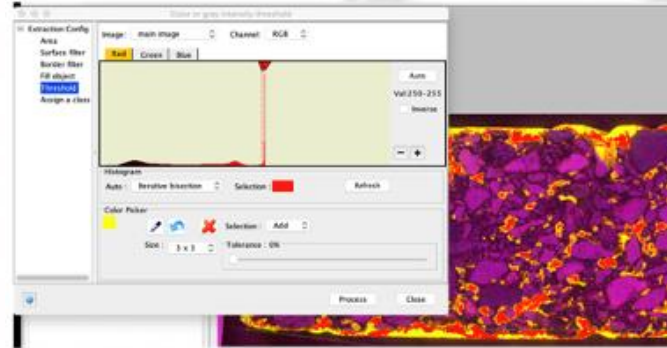
UV-Scanner

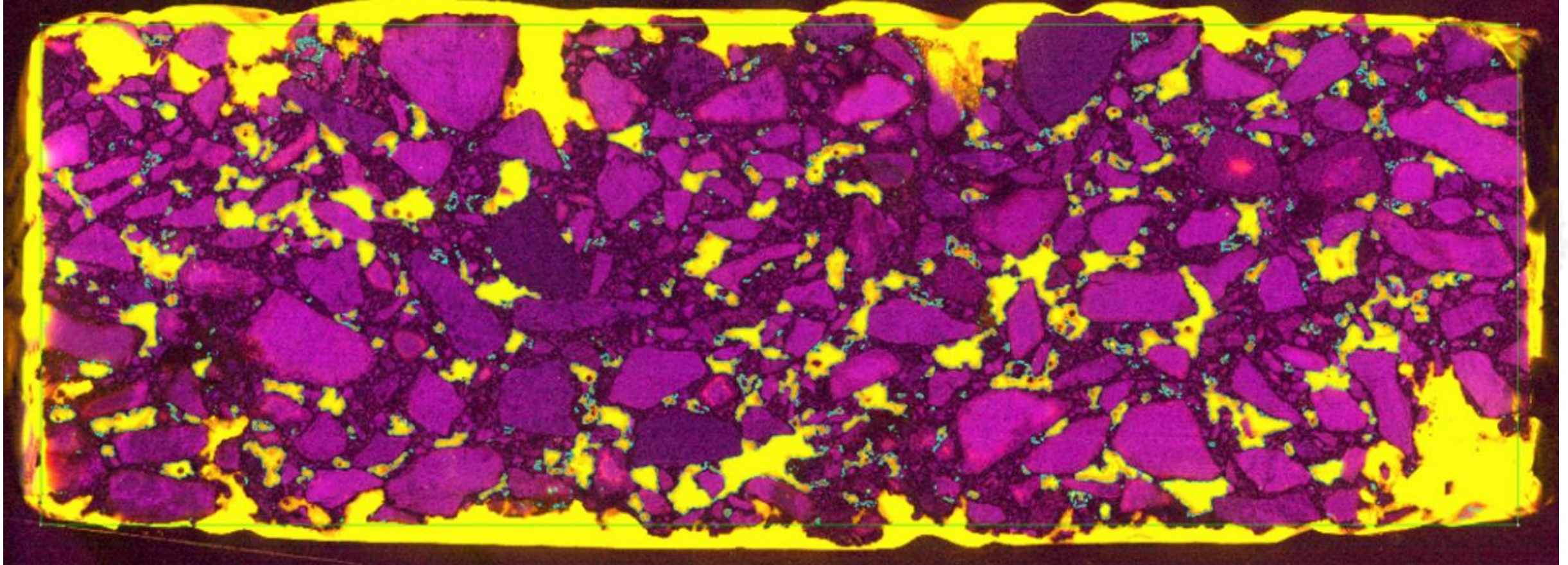
- Umbau nötig
- Hohe Lichtausbeute
- Geringes Rauschen

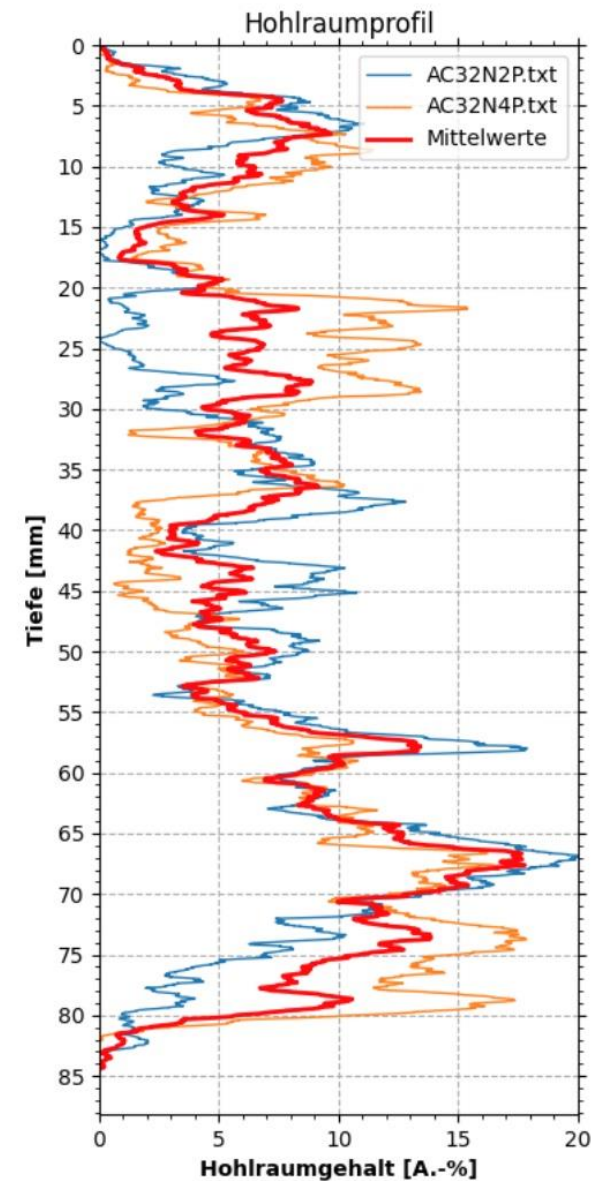
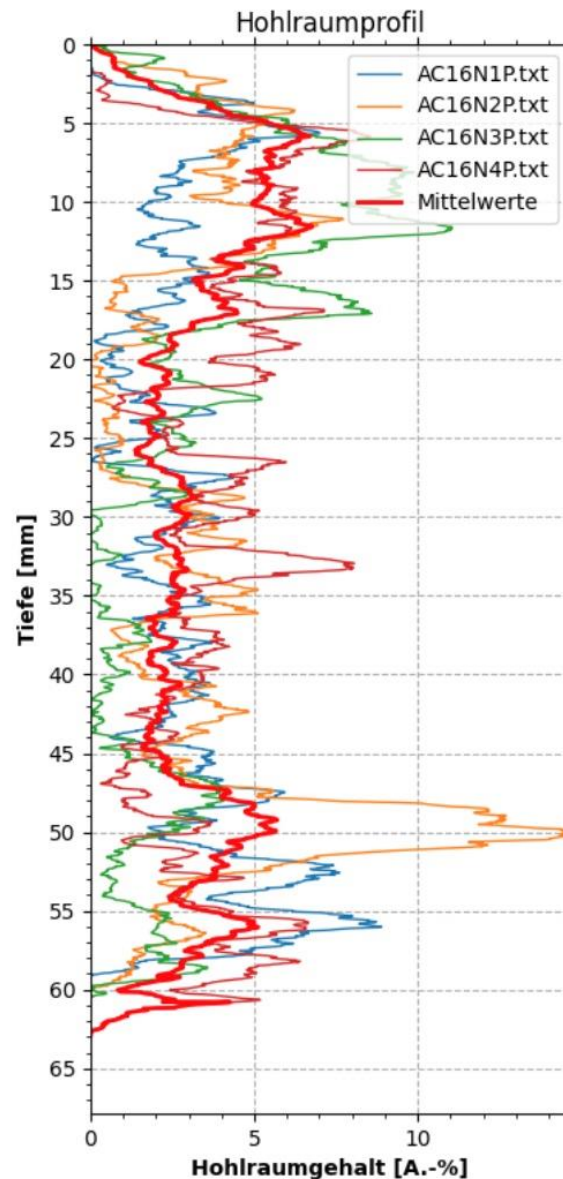
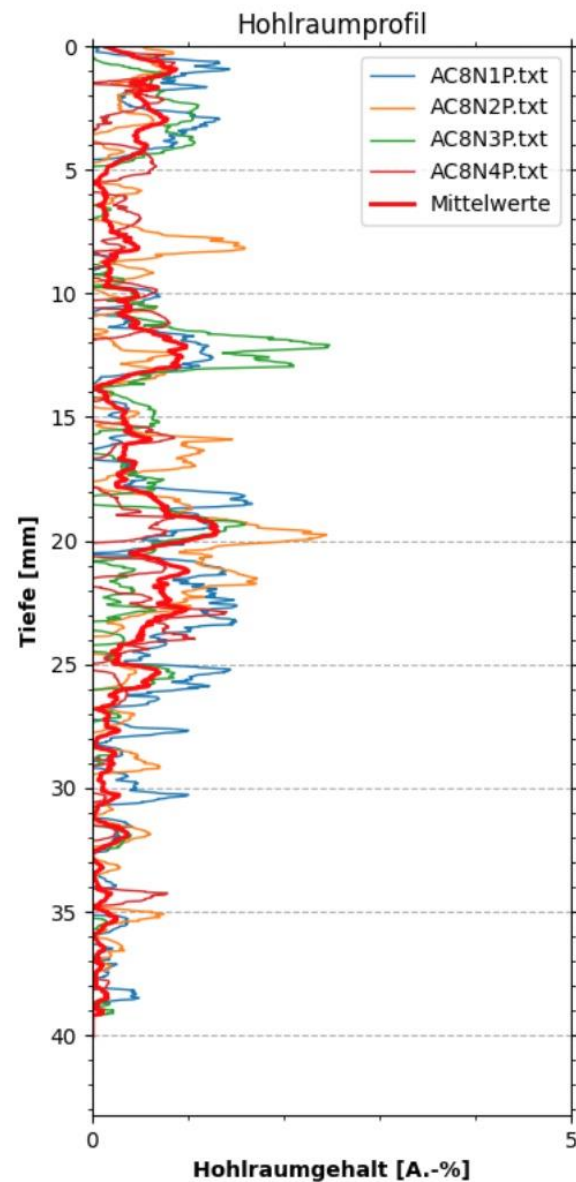


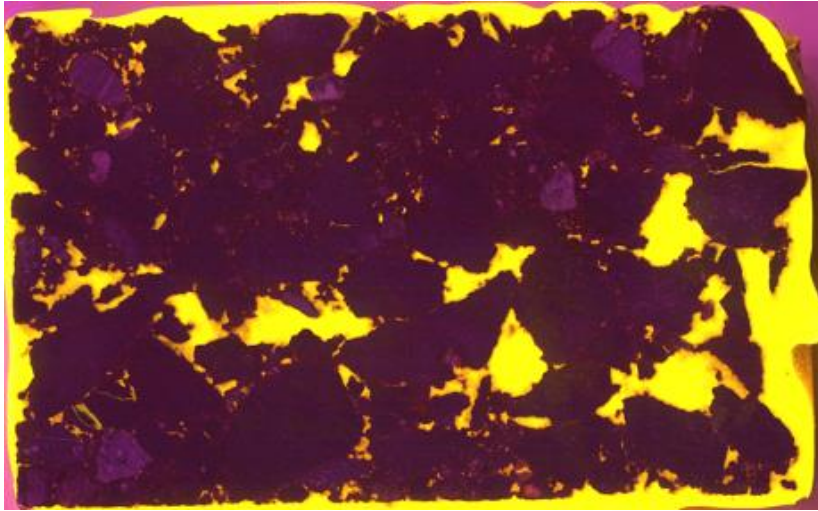
Zu identifizierende Parameter:

- Hohlraumgehalt
- Hohlraumverteilung
- Hohlraumgröße

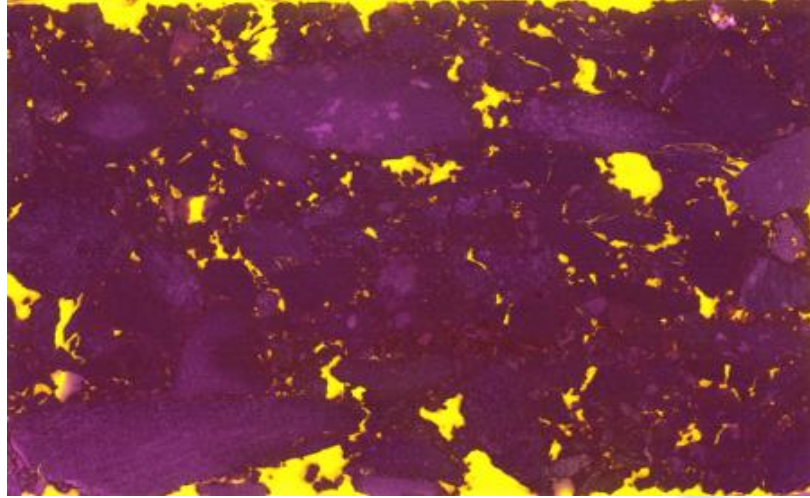




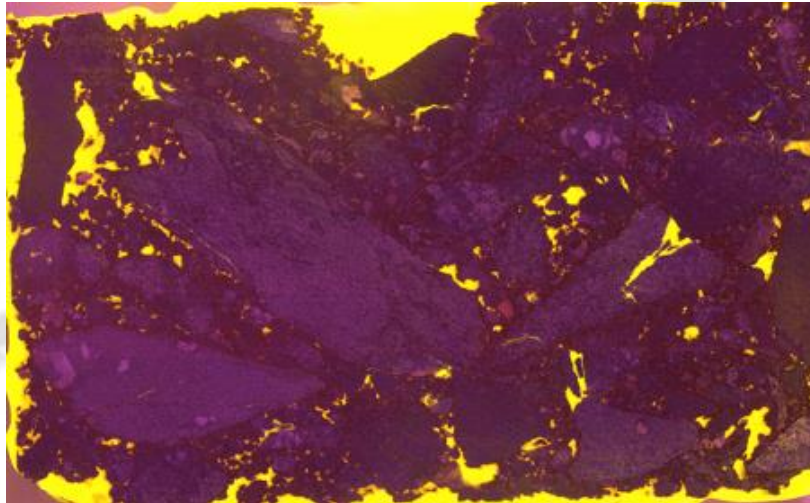
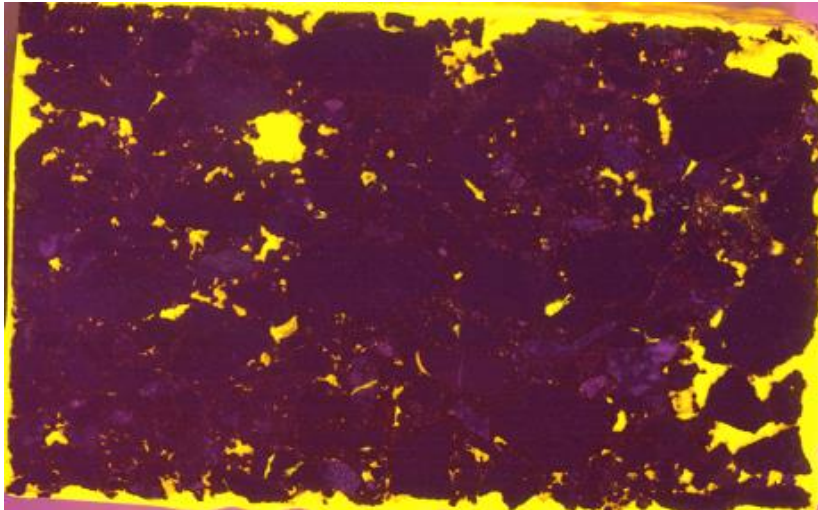




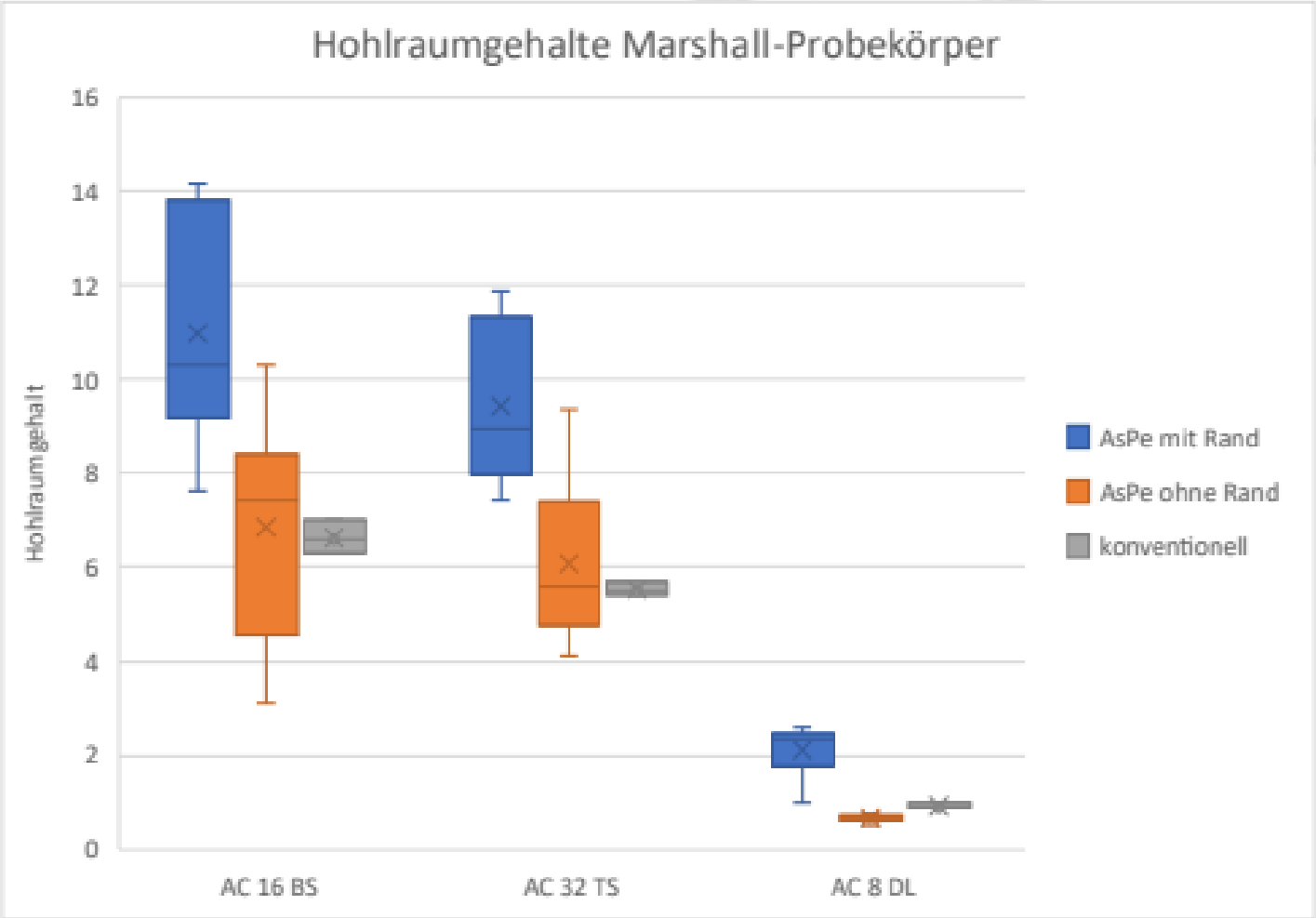
AC 16 BS



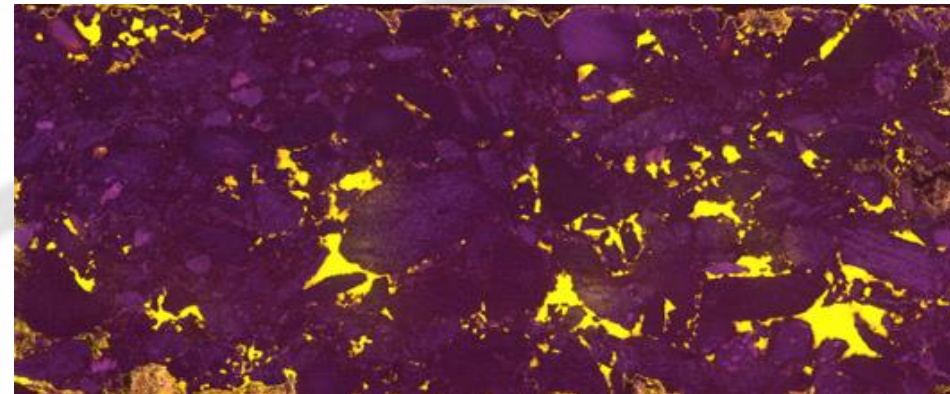
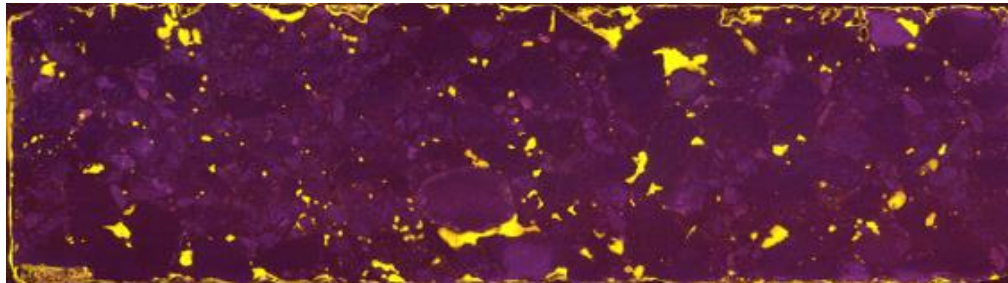
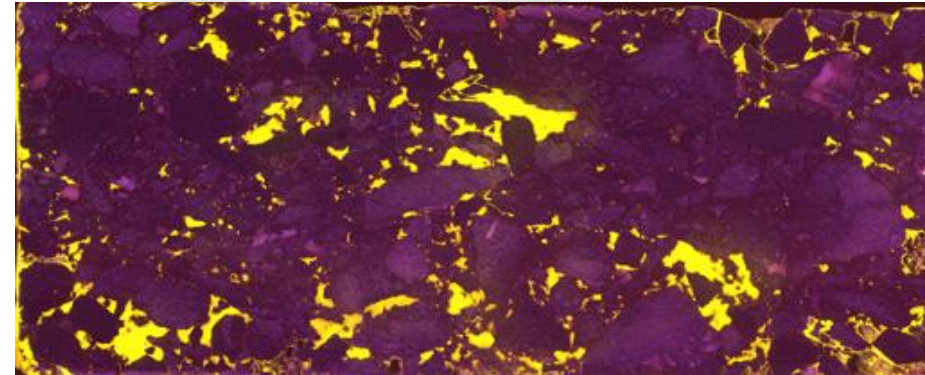
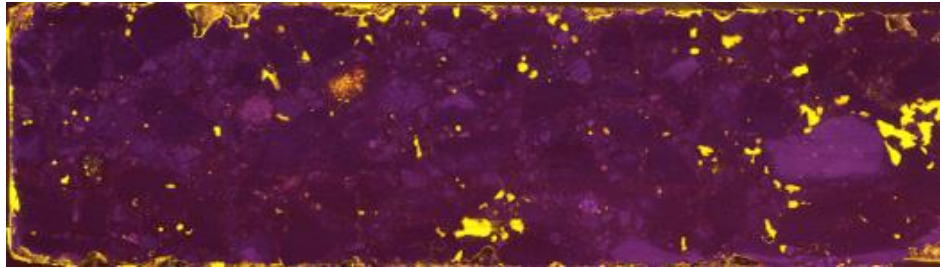
AC 32 TS



Marshall-Probekörper

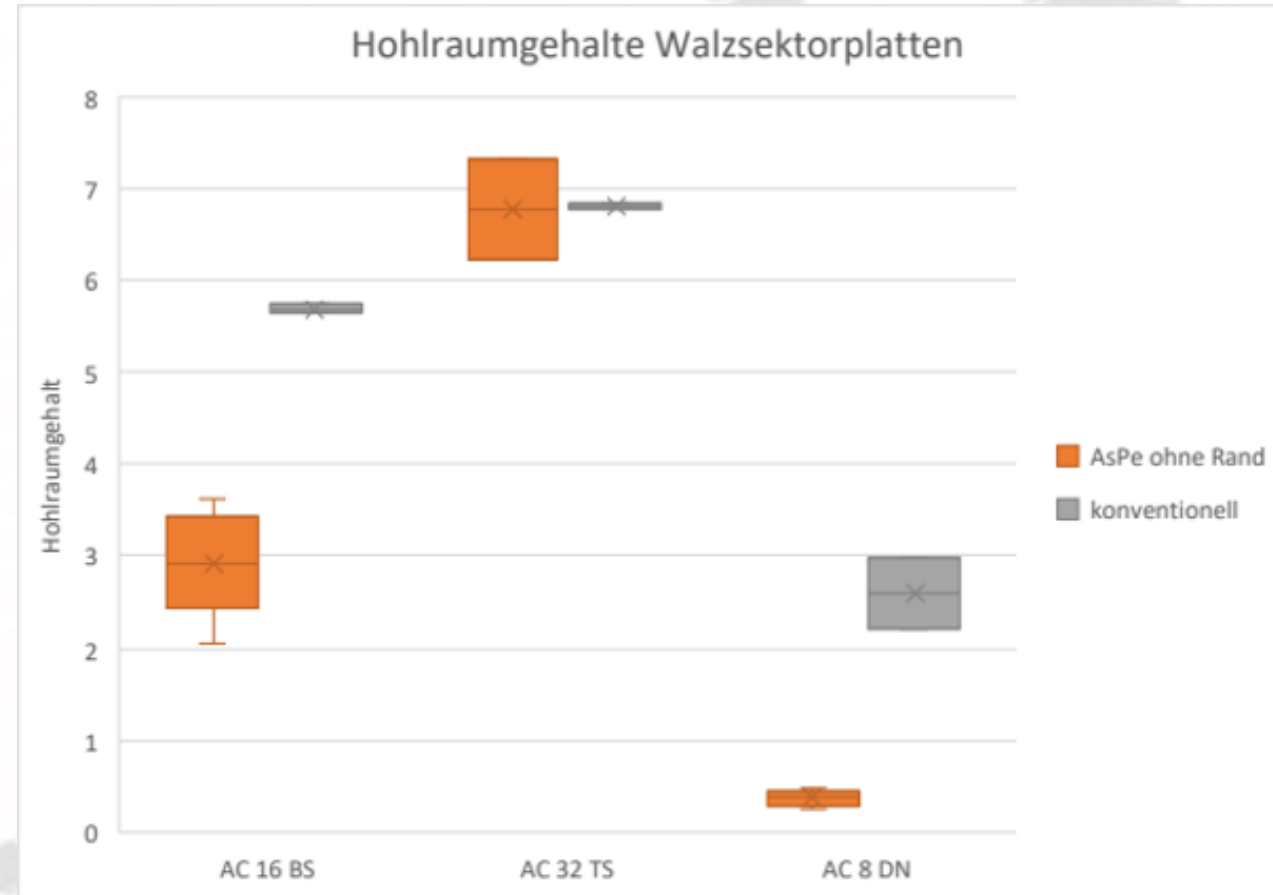


Platten aus dem Walzsektorverdichter

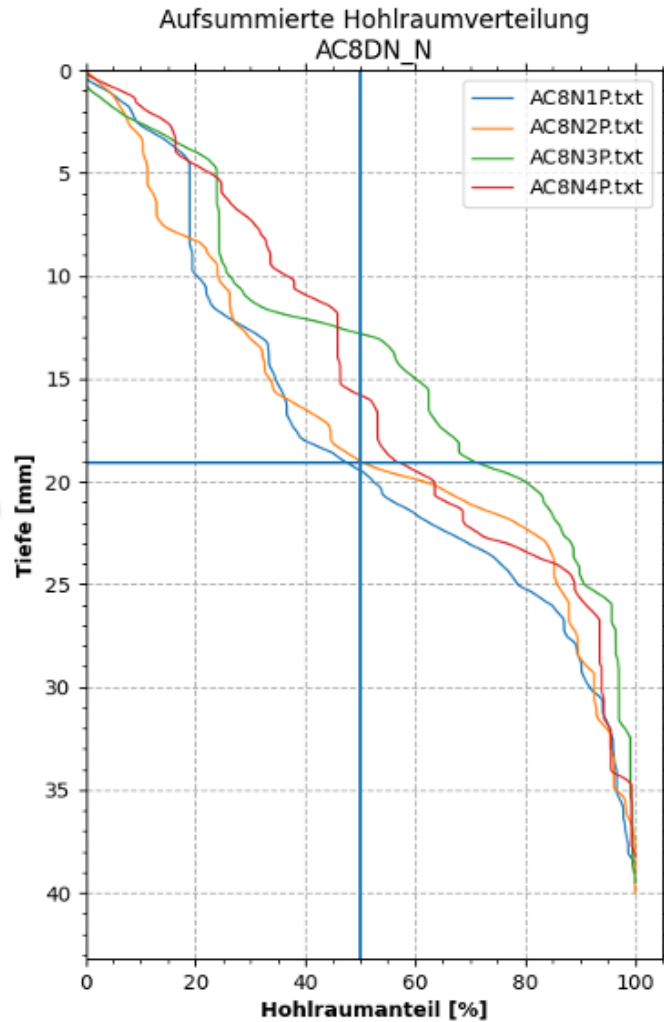


AC 16 BS

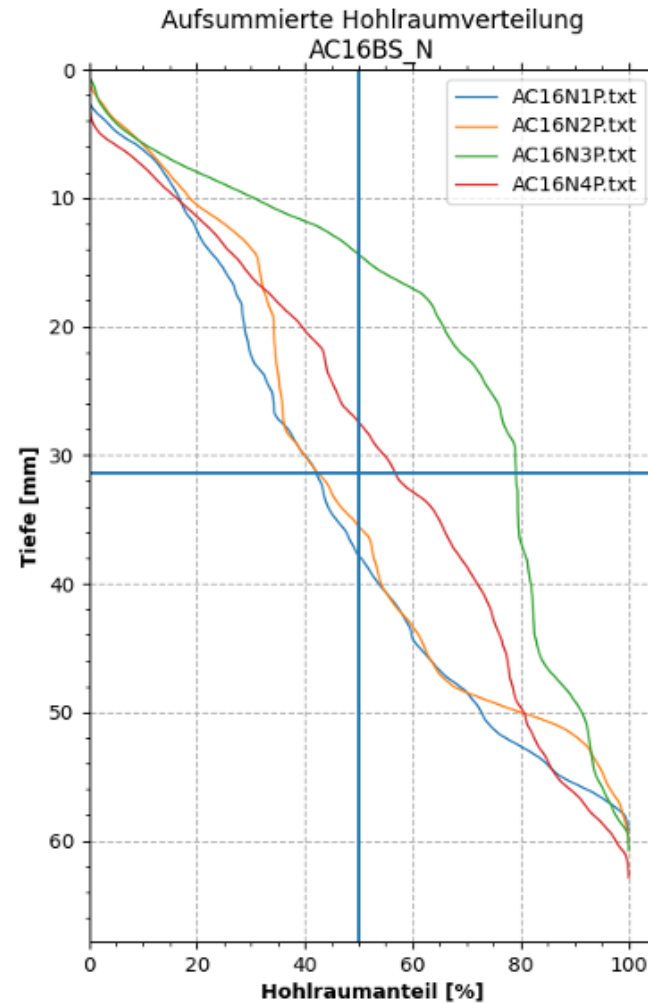
AC 32 TS



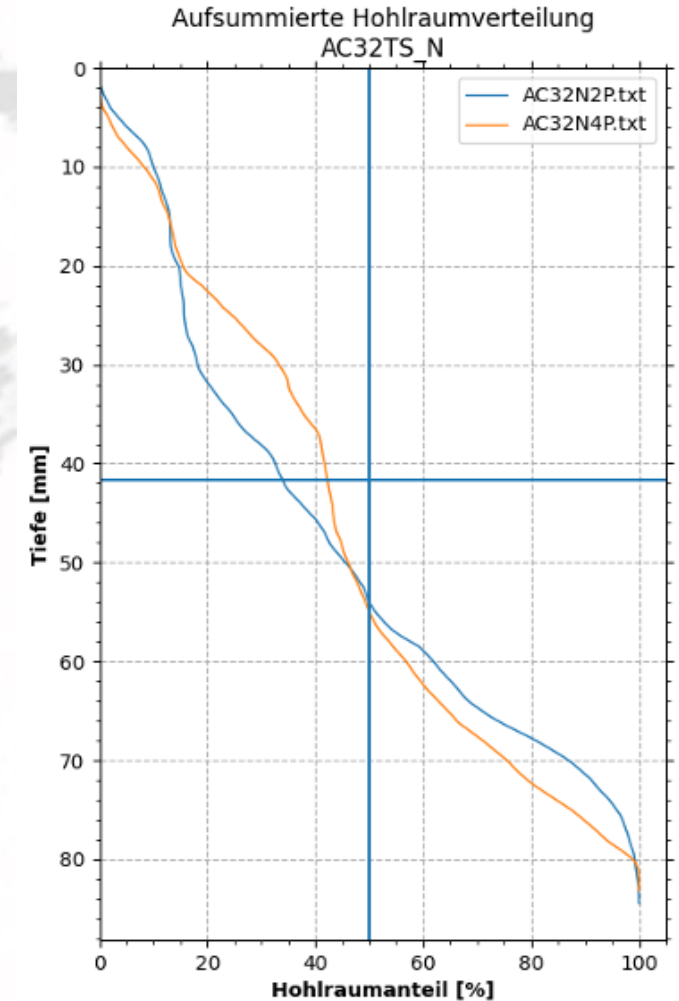
Hohlraumverteilung



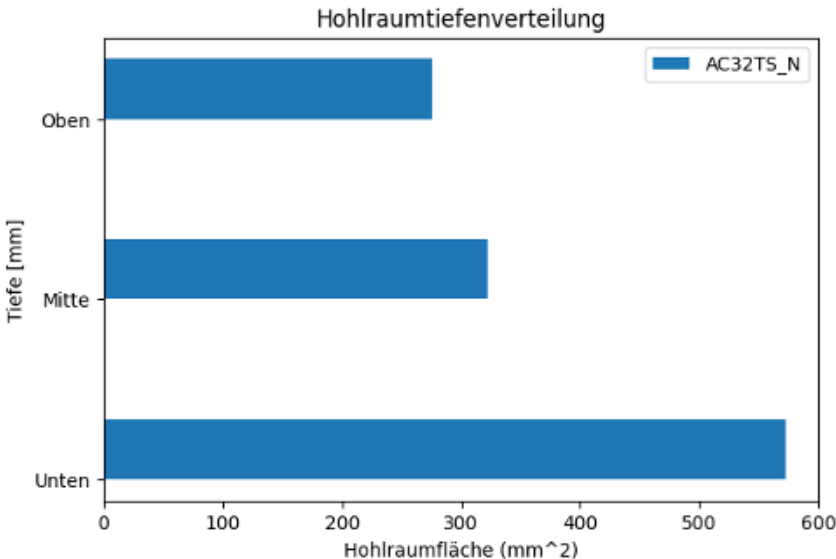
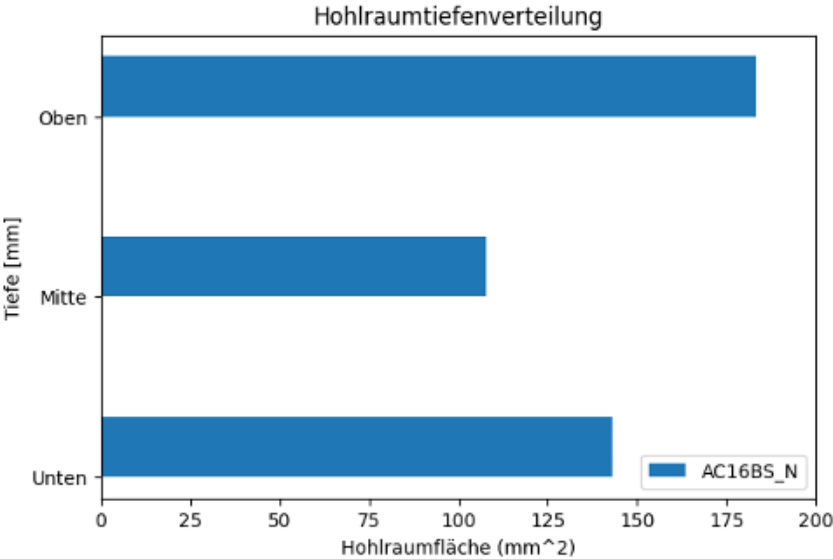
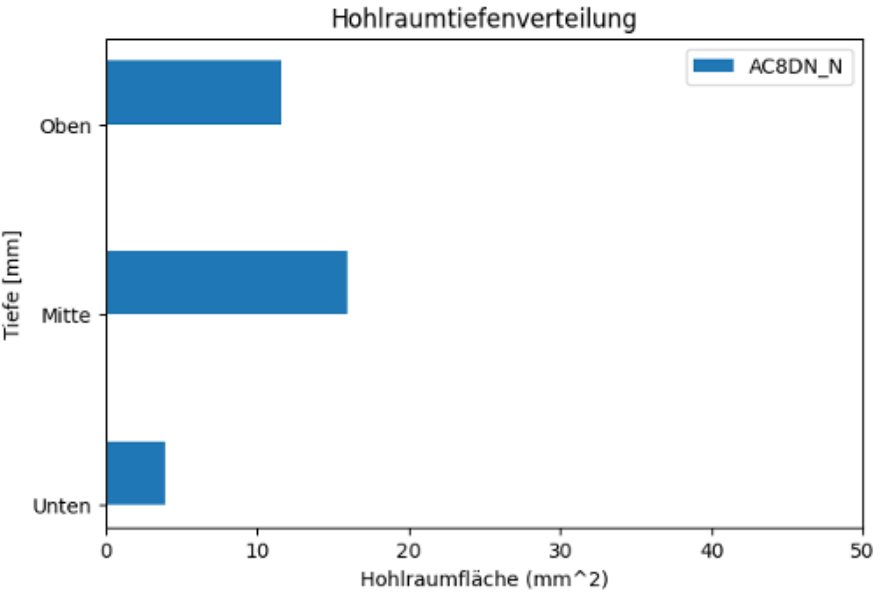
Wenig Hohlräume im unteren Bereich

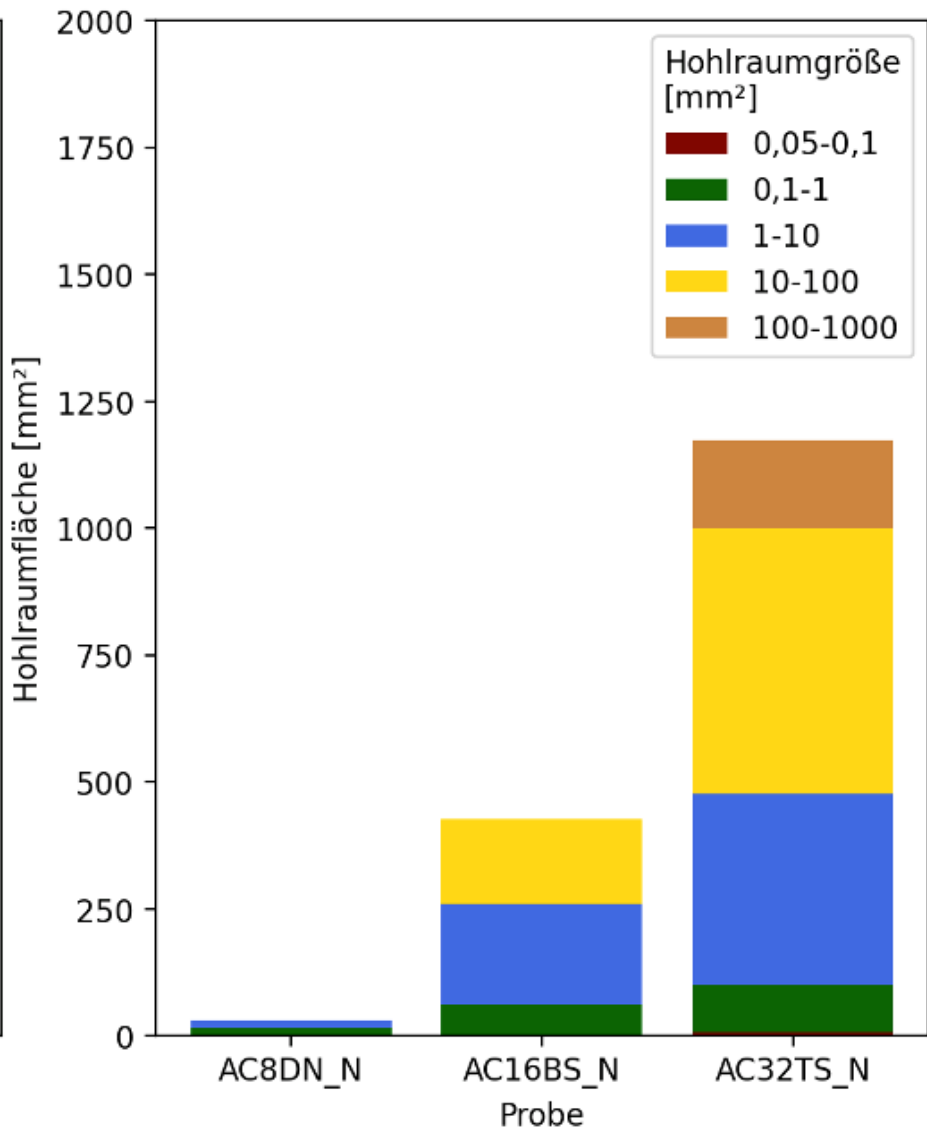
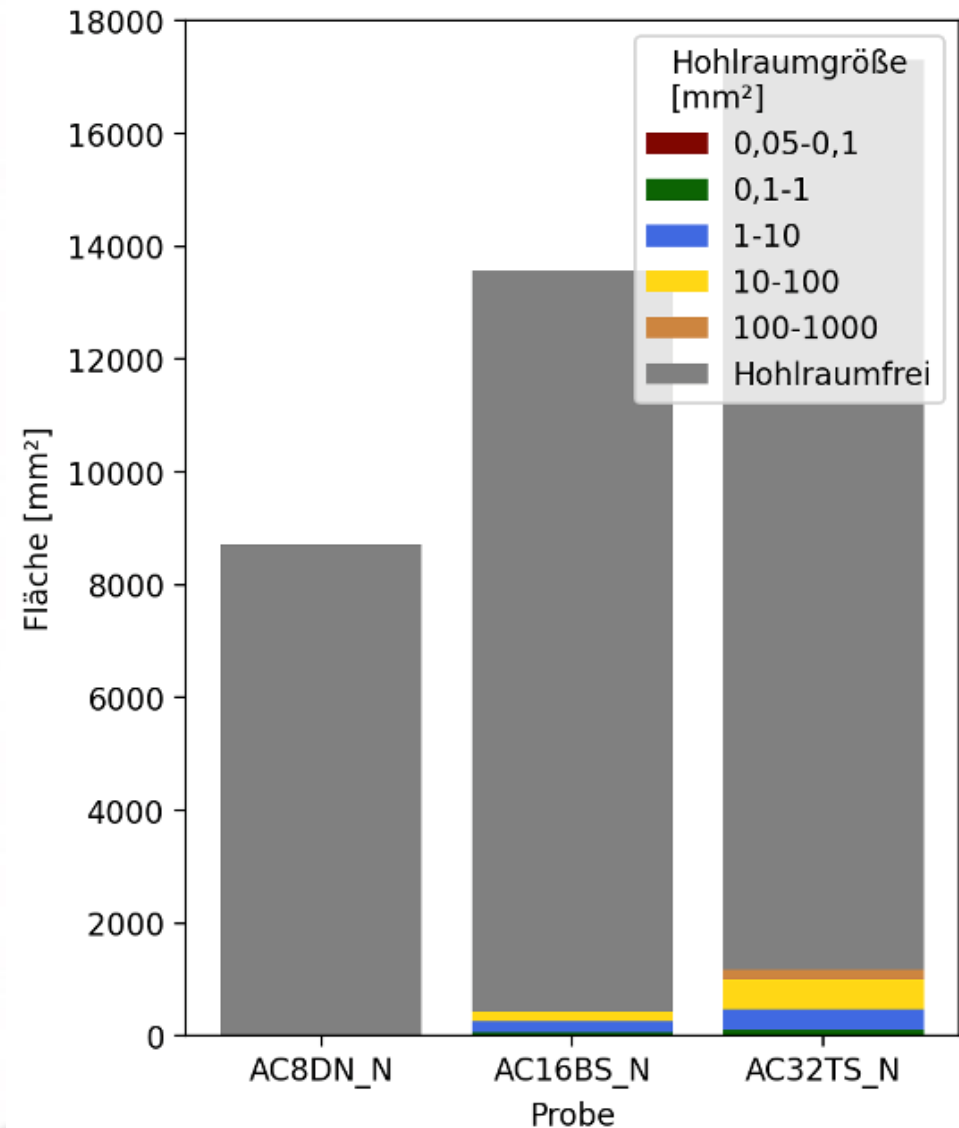


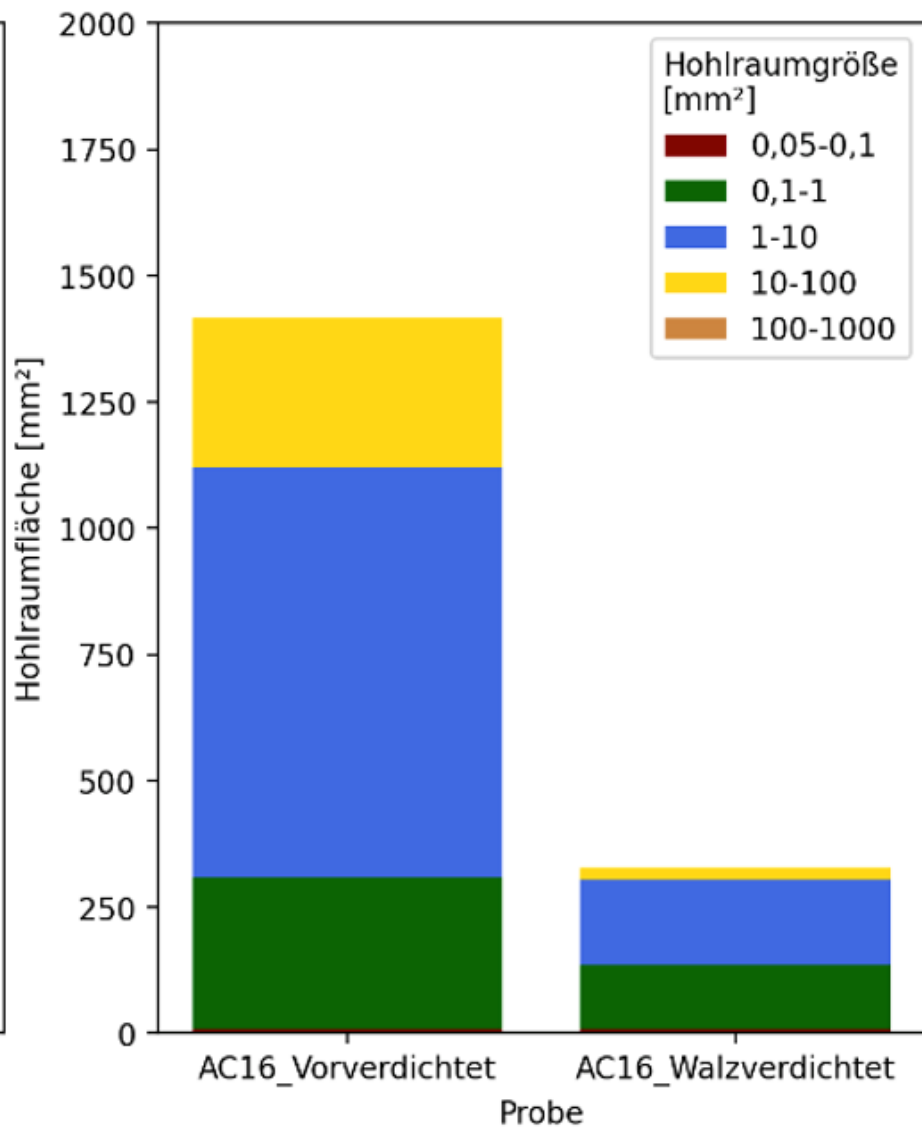
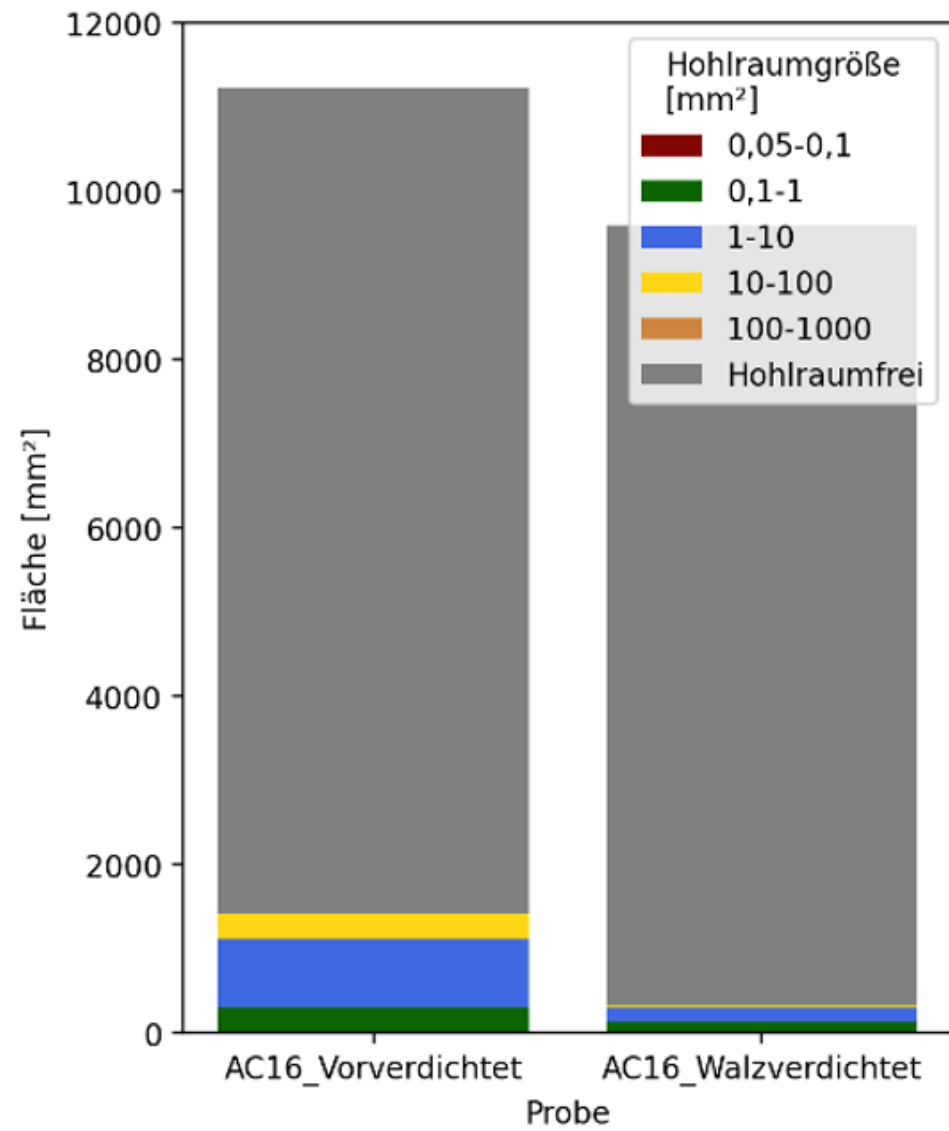
Weitgehend homogene Verteilung



Viele Hohlräume im unteren Bereich

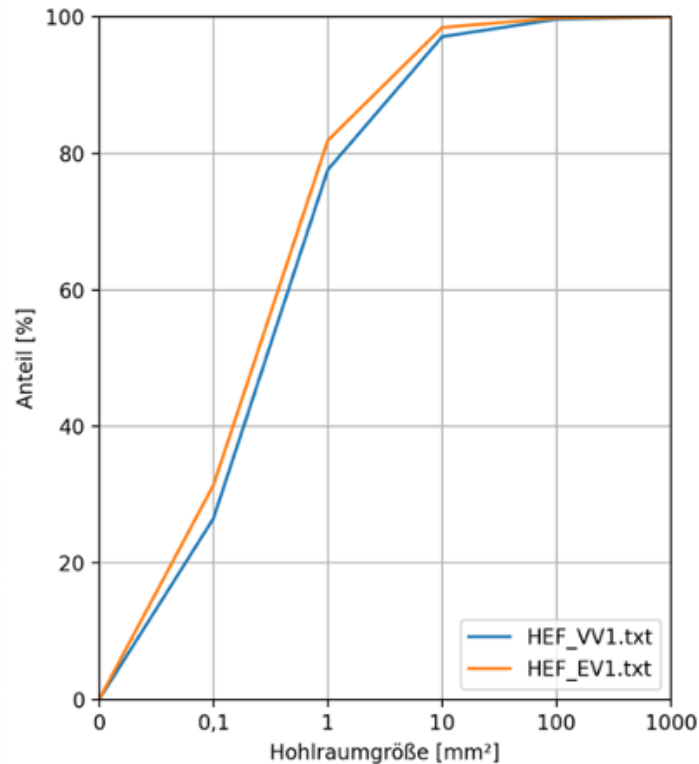




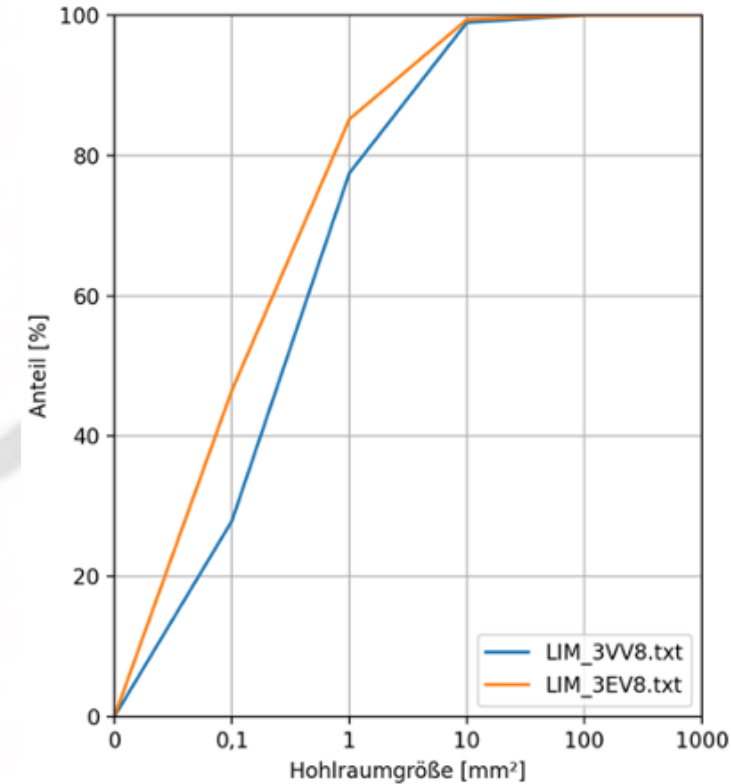


Vergleich von Vorverdichtung mit Endverdichtung

Hohlraumgrößenverteilung Bad Hersfeld Abschnitt 1

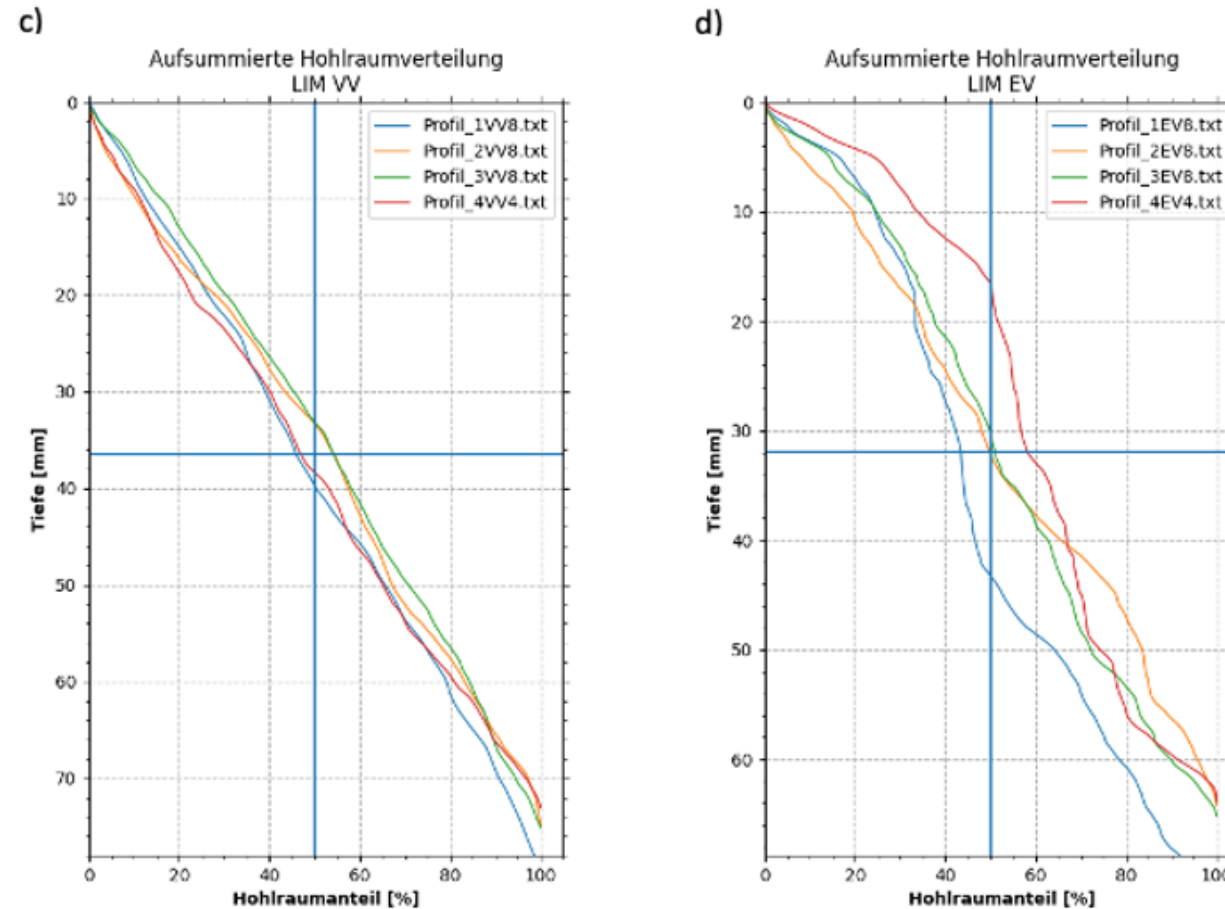


Hohlraumgrößenverteilung Limburg Abschnitt 3



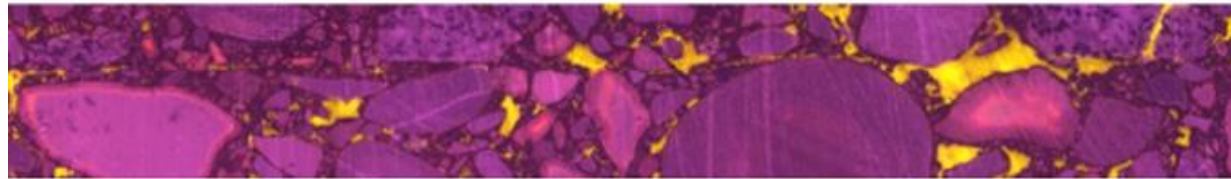
Quelle: Di Turi & Harries (2022)

Vergleich von Vorverdichtung mit Endverdichtung

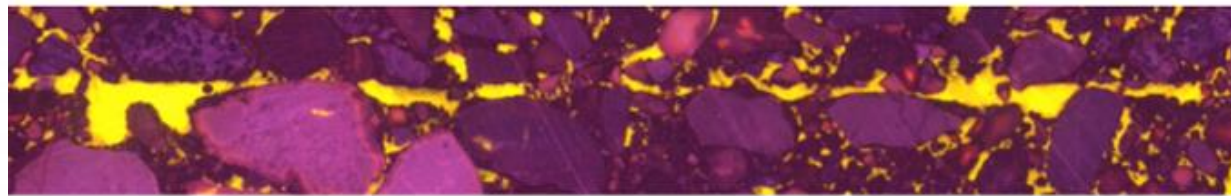


Quelle: Di Turi & Harries (2022)

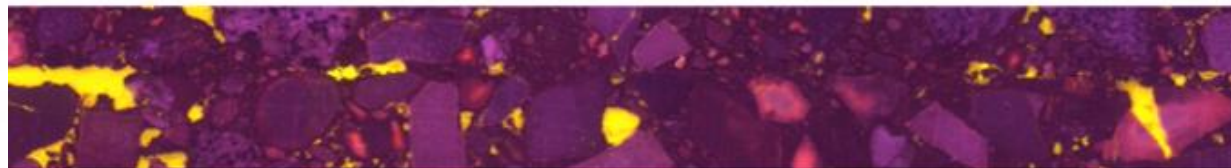
Schichtenverbundes und Sprühfertigers (a Seite, b hinter Kette, c Mitte)



a)



b)



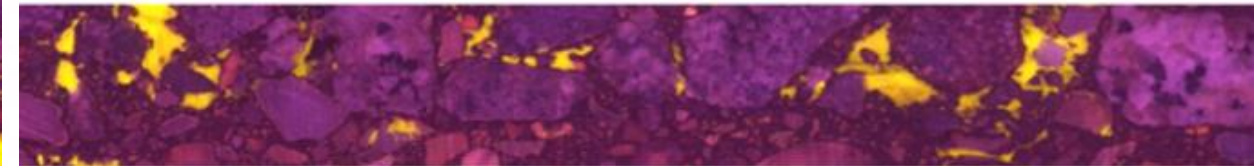
c)

C40 B5-S

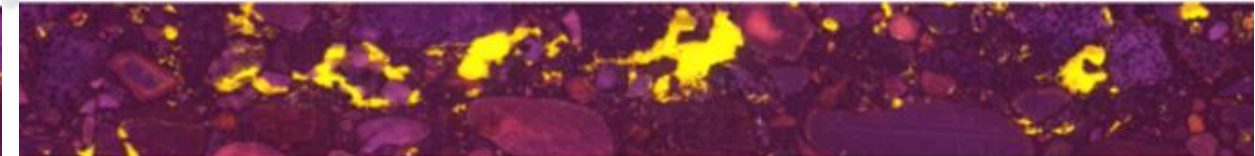
Quelle: Böhm et al. (2021)



a)



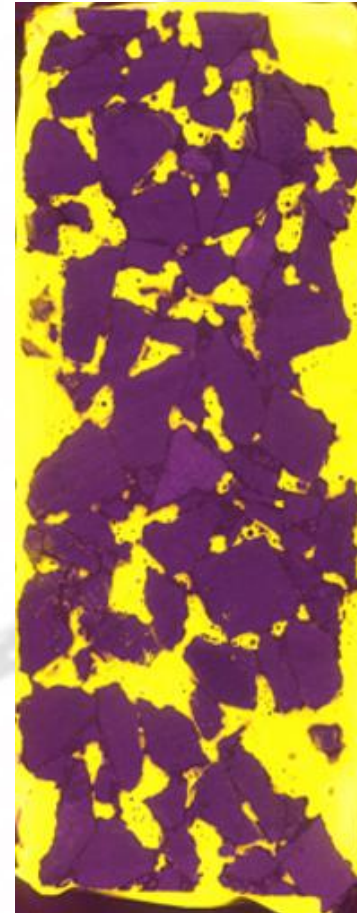
b)



c)

C60 BP4-S

Korrelation Hohlraumgrößen mit Durchlässigkeit



Klasse	Von [mm ²]	Bis [mm ²]
A	0,05	0,1
B	0,1	1
C	1	10
D	10	50
E	50	100
F	100	1000

$$FR(VC) = \beta_1 \cdot VC_B + \beta_2 \cdot VC_C + \beta_3 \cdot VC_D + \beta_4 \cdot VC_E + \beta_5 \cdot VC_F$$

Korrelationskoeffizient von >0,98

Quelle: Böhm et al. (2022) (noch nicht veröffentlicht)

- Böhm, S., Middendorf, M., & Flottmann, N. (2021). Einbau von Walzasphalt unter Verwendung eines Sprühfertigers. *Straße und Autobahn*, 72(10), Art. 10.
- Di Turi, T., & Harries, L. (2022). Untersuchung zum Wirkmechanismus der Walzverdichtung mittels bildanalytischer Verfahren und hochauflösenden Oberflächenvermessungen. *Straße und Autobahn*, 2022(01), Art. 01.
- Technische Universität Darmstadt, Institut für Verkehrswegebau. (2022). *Ermittlung und Parametrisierung der Hohlraumverteilung in Asphaltprobekörpern mit asphaltpetrologischen Methoden*.

Vielen Dank für Ihre Aufmerksamkeit!