Aufgabe 01.4

Platin 90% $\rho_{Pt} = 21450\ kg/m^3$

Iridium 10% $\rho_{Ir} = 22560\ kg/m^3$

Zylind $H = 3.9\times10^{-2}\ m$, $D = 3.9\times10^{-2}\ m$, $R = 1.95\times10^{-2}\ m$

(a) Zylindrisches Gewicht:

$$V_{Zy} = \pi \cdot R_{Zy}^2 \cdot H_{Zy} = 3.14 \times (1.95)^2 \times 3.9 \times 10^{-6}$$
$$= 4.6565 \times 10^{-5}\ m^3$$

$$M_{Zy} = \rho \cdot V_{Zy} = (90\% \rho_{Pt} + 10\% \rho_{Ir}) \cdot V_{Zy}$$
$$= (0.9 \times 21450 + 0.1 \times 22560) \times 4.6565 \times 10^{-5}$$
$$= 21561 \times 4.6565 \times 10^{-5}$$
$$= 100398.7965 \times 10^{-5}$$
$$= 1.00398\ 7965\ kg$$

$$M_{cut} = M_{Zy} - 1.0000kg = 0.00398\ 7965\ kg$$
$$\approx 0.0040\ kg$$

MAX: (N-Zy1)

(b) ① 89% Pt, 11% Ir, $H = 3.9\times10^{-2} + 2\times10^{-6}\ m$, $R = 1.95\times10^{-2} + 2\times10^{-6}\ m$

$$V_{N\text{-}Zy_1} := \pi \cdot R_{N\text{-}Zy_1}^2 \cdot H_{N\text{-}Zy_1} = \cdot\ 4.6565 \times 10^{-5}\ m^3$$

$$M_{N\text{-}Zy1} = \rho \cdot V_{N\text{-}Zy_1} = (89\% \rho_{Pt} + 11\% \cdot \rho_{Ir}) \cdot V_{N\text{-}Zy_1}$$
$$= 21572.1 \cdot 4.6565 \times 10^{-5}\ m^3$$
$$= 1.00450\ kg$$

$$M_{N\text{-}Cut_1} = M_{N\text{-}Zy1} - 1.0000kg \approx 0.0045kg$$

(c) ② Min: (N-Zy2)

91% Pt, 9% Ir, $H = 3.9\times10^{-2} - 2\times10^{-6}\ m$, $R = 1.95\times10^{-2} - 2\times10^{-6}\ m$

$$V_{N\text{-}Zy_2} = \pi \cdot R_{N\text{-}Zy_2}^2 \cdot H = 4.6553 \times 10^{-5}\ m^3$$

$$M_{N\text{-}Zy2} = \rho \cdot V_{N\text{-}Zy2} = (91\% \cdot \rho_{Pt} + 9\% \cdot \rho_{Ir}) \cdot V_{N\text{-}Zy2}$$
$$= (19519.5 + 2030.4) \cdot 4.6553 \times 10^{-5}$$
$$= 21549.9 \times 4.6553 \times 10^{-5}$$
$$= 1.00321\ kg$$

$$M_{N\text{-}Cut_2} = M_{N\text{-}Zy2} - 1.0000kg \approx 0.0032kg$$