数据处理过程

42024137 赵方程 物联201

伪公式

- 贝塞尔公式

  for_each(tokens.begin(), tokens.end(), add);

  for (auto &&i : tokens) Sigma+=pow((i-sum/tokens.size()),2);

  res=sqrt(Sigma/(tokens.size()-1));

- 不确定度

  Δ仪 = 0.004;

  U_d = sqrt(pow(res,2)+pow(deltaIns,2));

- 直径表达式

  $d \pm U_d = res \pm U_d$

  计算可得

  $d \pm U_d = 3.9390 \pm 0.0060mm$

- $average_l = \dfrac{\sum L}{n}$

  $U_l = \sqrt{\Delta_{仪}^2}$

  计算可得 $average_l \pm U_l = 410.0 \pm 0.6mm$

电阻率 $\rho = \rho_x \pm U_{\rho_x}$

$U_{r_n} = 0.1\% * R_n$

$\rho_x = \frac{\pi d^2 U_x R_n}{4 U_n l}$

$\frac{U_{\rho x}}{\rho_x} = \sqrt{(\delta \ln \rho_x/\delta d)^2 U_d^2 + (\delta \ln \rho_x/\delta U_x)^2 U_{u_x}^2 + (\delta \ln \rho_x/\delta R_n)^2 U_{R_n}^2 + (\delta \ln \rho_x/\delta U_n)^2 U_{U_n}^2 + (\delta \ln \rho_x/\delta l)^2 U_l^2}$

计算得 $U_{\rho_x} \approx 0.4\% \rho_x = 0.0065 \times 10^{-6} \Omega \cdot m$

$\rho = \rho_x \pm U_{\rho_x} = 1.3820 \pm 0.0065 \times 10^{-6} \Omega \cdot m$