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The simulation of gold adsorption by carbon using a film diffusion model

Johns, Mark William

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C SUBROUTINE TO CALCULATE THE VALUES OF THE SLOPE , THE INTERCEPT ,
C AND THE CORRELATION COEFFICIENT VIA LINEAR REGRESSION
C
C THE DATA THAT MUST BE PROVIDED TO THE SUBROUTINE
C NUMBER OF POINTS , X DATA , Y DATA
C
C OUTPUTTED DATA IS
C SLOPE , INTERCEPT , CORR COEFF
C
C DIMENSION ARRAYS
      DIMENSION X(100),Y(100)
C DEFINE SUBROUTINE
      SUBROUTINE LINREG(PD,X,Y,SLO,P,CC)
C SET SUMS EQUAL TO ZERO
      SX=0
      SY=0
      SX2=0
      SXY=0
      SCT=0
      SCBX=0
      SCBY=0
C CALCULATE VALUES NEEDED TO CALCULATE SLOPE INTERCEPT
      DO 10 I=1,PD
      SX=SX+X(I)
      SY=SY+Y(I)
      X2=X(I)**2
      SX2=SX2+X2
      XY=X(I)*Y(I)
      SXY=SXY+XY
 10   CONTINUE
C CALCULATE THE SLOPE AND INTERCEPT
      SLO=(SXY-((SX*SY)/PD))/(SX2-((SX**2)/PD))
      INT=(SY-(SLO*SX))/PD
      P=EXP(INT)
C CALCULATE VALUES FOR CALCULATION OF CORR COEFF
      XA=SX/PD
      YA=SY/PD
      DO 20 I=1,PD
      CT=(X(I)-XA)*(Y(I)-YA)
      SCT=SCT+CT
      CBX=((X(I)-XA)**2)
      CBY=((Y(I)-YA)**2)
      SCBX=SCBX+CBX
      SCBY=SCBY+CBY
 20   CONTINUE
C CALCULATE CORR COEFF
      CC=SCT/((SCBX**0.5)*(SCBY**0.5))
C END SUBROUTINE
      RETURN
      END
```

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