Lectures, Presentations etc.

"Dimensionless sensitivity for analysis, diagnostics, modelling, monitoring and prognosis of processes" by Dr. Petro S. Smertenko

Here you can find the following points:

1. Definition of dimensionless sensitivity.
2. Geometric and physical means of parameters α and γ.
3. Accuracy of dimensionless sensitivity and measurement step.
4. Practical application of the dimensionless sensitivity approach:
   - general diagnostics of curves;
   - curves modeling;
   - special cases.
5. Conclusion.
6. Afterwords.

Diagnostic possibilities

1. General diagnostics of curves.
2. Modelling of curves.
3. Analytical reconstruction of approximations.
4. Analysis of current-voltage characteristics.
5. Recognition of fine structure of curves.
6. Control of quality.
7. Monitoring of parameters.
8. Prognosis of processes behaviour.

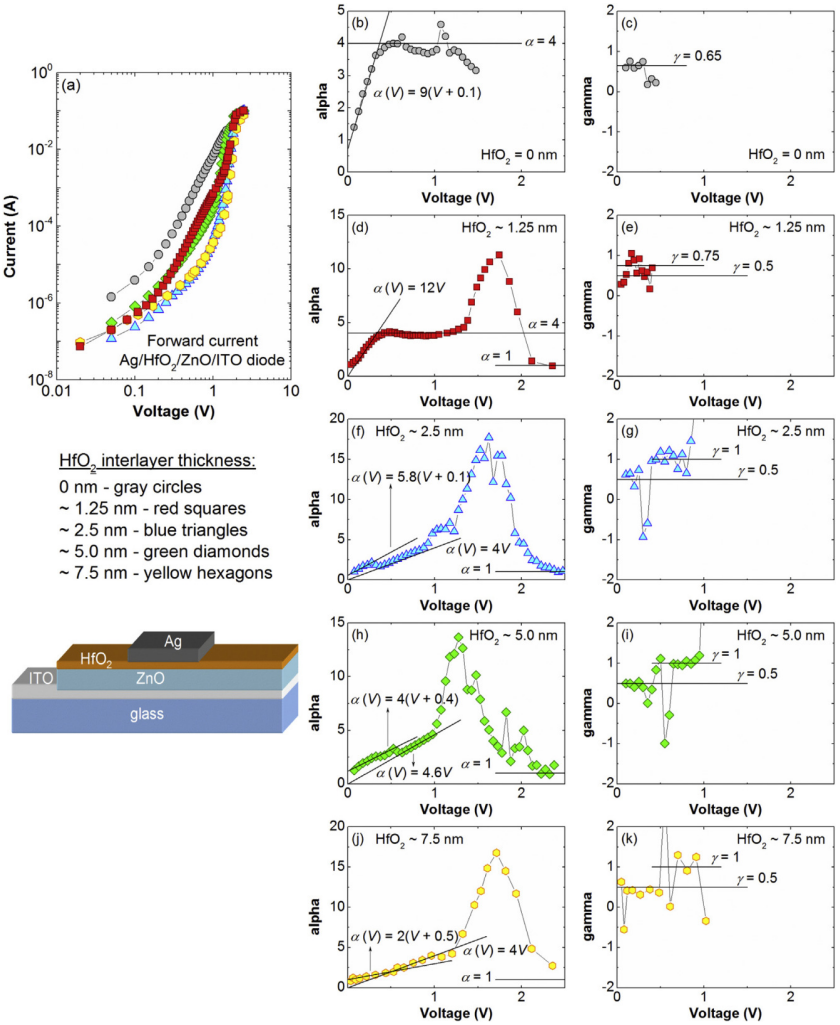
Now the technologies dominate in all spheres of production.

There are a huge number of testing and controlling approaches and techniques.

Description of fine behavior of curves demands new approaches for their analysis.

One of new approaches is the differential approach that combines mathematical description with the physical meaning of processes of various and different nature.

The main difference of proposed approach from the other differential techniques (first-order or second-order derivatives) is **the dimensionless value** that allows comparing parameters and characteristics of structures or devices based on various behavior and physical processes.



Forward current-voltage characteristics of Me/HfO/ZnO/Me structure and their dimensionless sensitivities.

The differential method of the analysis consists in determination of dimensionless values

$$\alpha(x)=\frac{d(\lg y)}{d(\lg x)}=\frac{x}{y}\cdot\frac{dy}{dx} \qquad (1)$$

and

$$\gamma(x)=\frac{d(\lg \alpha)}{d(\lg x)}=\frac{x}{\alpha}\cdot\frac{d\alpha}{dx}, \qquad (2)$$

which for finite increments of argument has aspects:

$$\alpha\left(\frac{x_n+x_{n+1}}{2}\right)= =\frac{x_{n+1}+x_n}{x_{n+1}-x_n}\cdot\frac{y_{n+1}-y_n}{y_{n+1}+y_n} \qquad (3)$$

and

$$\gamma\left(\frac{x_k+x_{k+1}}{2}\right)= =\frac{x_{k+1}+x_k}{x_{k+1}-x_k}\cdot\frac{\alpha_{k+1}-\alpha_k}{\alpha_{k+1}+\alpha_k}, \qquad (4)$$

where $x_k=(x_{n+1}+x_n)/2$.

We are looking for feedback, new proposals for lectures, presentations, *etc*.

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