8.0 µm, forming a resistor strip, and

c) the lacquer is removed from the substrate,

and, in a second stage,

d) a photolithographic process is again carried out in which a precisely defined region of the resistor strip is covered with laquer,

e) the entire substrate surface is covered with a layer of a metal having a specific resistance of 0.01 Ω*mm to 0.1 Ω*mm in a thickness of 0.1 µm to 20 µm, wherein the application of the metal is configured such that in regions which have a bare substrate from the first photolithographic process, no metal adheres, and

f) the lacquer from the second photolithographic process is again removed.

In another aspect, the present invention provides use of the method disclosed herein for producing pyrotechnic trigger elements.

Detailed Description

It is an object of the invention to provide a new method for producing initial elements based on PVD layers that enables a clean configuration of the edges of the resistor layers. It is also desirable to reduce the manufacturing costs.

According to the invention, the object is achieved in that firstly a lacquer is applied by photolithography onto the substrate. This prevents a coating of the substrate in a large region, but leaves free a region of the substrate surface of precisely defined width.

Claims

1. A method for producing electric trigger elements for pyrotechnic articles, characterized in that, in a first stage,
   a) a lacquer is applied by photolithography to an electrically non-conductive substrate,
   b) a conductive material having a specific resistance of 0.1 Ω*mm to 5.0 Ω*mm is applied to the lacquer and substrate by means of a PVD process in a layer thickness of 0.02 µm to 8.0 µm, forming a resistor strip, and
   c) the lacquer is removed from the substrate,

   and, in a second stage,
   d) a photolithographic process is again carried out in which a precisely defined region of the resistor strip is covered with lacquer,
   e) the entire substrate surface is covered with a layer of a metal having a specific resistance of 0.01 Ω*mm to 0.1 Ω*mm in a thickness of 0.1 µm to 20 µm, wherein the application of the metal is configured such that in regions which have a bare substrate from the first photolithographic process, no metal adheres, and
   f) the lacquer from the second photolithographic process is again removed.

2. The method as claimed in claim 1, characterized in that, in the first stage, the width of the resistor strip is defined by the photolithographic process and insulation is provided in the surrounding regions.

3. The method as claimed in claim 1, characterized in that the length of the resistor strip is defined by the photolithographic process in the second stage.

4. The method as claimed in claim 1 or 2, characterized in that the thickness of the resistor strip is determined by the PVD process in step b).

5. The method as claimed in any one of the preceding claims, characterized in that the layer applied in step b) is configured in a thickness exceeding the desired resistance value and by step-wise removal, the thickness is reduced and thereby the resistance is precisely set.

6. The method as claimed in any one of the preceding claims, characterized in that, in the event that no reinforcement of contact surfaces by means of additional readily conductive layers is required, the entire resistor geometry is realized with a photomask in a single lithographic process.

7. The method as claimed in any one of the preceding claims, characterized in that, in step e), a readily conductive layer is applied.

8. Use of the method as claimed in any one of the preceding claims for producing pyrotechnic trigger elements.