A projectile trap composition comprising 10% to 100% by weight of metalloocene polyolefin wax and/or its derivatives. The projectile trap composition of the present invention has high permeability for projectiles with self-healing behavior and it effects the complete deceleration of impacting projectiles in a system of different plates and in some instances additionally a section of projectile trap composition granules.
Fig. 1

Sketch:

\[ \rightarrow \rightarrow \text{Direction of bullet} \]

\[
\begin{array}{c|c|c}
\text{Plate 1} & \text{Plate 2} & \text{Plate 3} \\
\end{array}
\]

Fig. 2

Sketch:

\[ \rightarrow \rightarrow \text{Direction of bullet} \]

\[
\begin{array}{c|c|c|c|c}
\text{Plate 1} & \text{Granule section} & \text{Plate 2} \\
\end{array}
\]

Fig. 3

Sketch:

\[ \rightarrow \rightarrow \text{Direction of bullet} \]

\[
\begin{array}{c|c|c|c|c|c|c|c}
\text{Plate 1} & \text{Plate 2} & \text{Plate 3 with steel sheet as backstop} \\
\end{array}
\]
The present invention relates to a projectile trap composition which is used for decelerating and trapping projectiles in bullet-trapping devices, or which is used directly, in the form of self-supporting shaped articles, for decelerating and trapping projectiles. Projectile trap compositions used for lining bullet traps or entire shooting ranges should satisfy several conditions at one and the same time. First, they have to be capable of trapping projectiles very resiliently, i.e., of absorbing the kinetic energy of the projectiles and, in the process, of decelerating the projectiles such that the construction or bullet trap to the rear of the projectile trap composition is not damaged, and that ricochets are virtually impossible. Since the firing of heavy metal projectiles at materials can cause the release of noxants in the form of vapors and dusts due to abrasion and/or fragmentation of the heavy metal projectiles, the use of special materials shall ideally prevent the release of heavy metals and bind as effectively as possible the emissions which are inherently formed nonetheless. Furthermore, the projectile trap composition shall withstand the projectile firing for a very long period before it has to be replaced. Furthermore, the compositions used shall be simple to recycle so that they may also be used again. This also includes the recycling of the lead of the projectiles, which have to be simple to separate from the projectile trap composition. Projectile trap compositions are known that consist of elastomeric, possibly multilayered materials. Elastomeric materials have the disadvantage that, at certain calibers they are prone to ricochets in the direction of the shooter because of their high elasticity and that the structure of a damaged rubber is permanently destroyed under ongoing firing, so that the composition becomes inutile at every bullet entry point and has to be replaced relatively quickly.

DE 32 12 781 discloses bullet trap media composed of waste rubber granules bound with a synthetic resin. DE 34 42 984 discloses projectile trap materials composed of rubber, regenerated rubber and elastomers. Hot-melt compositions are known which have an inherent sag resistance, so that the composition remains without support, as a coating or shaped article, in or on the bullet trap without flowing. With the hot-melt compositions, the tunnel formed by an incoming bullet reseals as a result of the heat evolved as the bullet penetrates, which ensures an ability to withstand frequent shooting. Mixtures of various polymers are necessary for this. EP 0369401 describes devices composed of thermoplastic material and mixtures with plasticizers wherein the spent material of the device is cleaned/purified by melting. EP 0518 330 describes specific compositions of atactic polypropylene, polyisobutylene and a hydrocarbon resin, or natural resin. Finally, DE 4 234 457 describes mixtures of amorphous polyolefin (APO) copolymer, terpene resin and polyisobutylene. However, these mixtures are so soft that they need sheet metal at the back wall for complete deceleration of the projectiles.

It is an object of the present invention to provide projectile trap compositions which can be used as effective projectile trap compositions having defined properties even without admixture with resins and other materials. Even as pure materials, the compositions shall make it possible, depending on their molecular constitution, to actualize differences in the deceleration behavior of projectiles in a specific manner, so that not only the use as shaped articles at the front end of the bullet-trapping systems shall be possible and for this use good projectile-trapping properties, such as automatic closure of the bullet tunnel, safeness from ricochets, ability to withstand frequent shooting, good ability to retain noxants and simple recyclability shall be actualizable, but there should also be available materials suitable for completely stopping the projectiles in shaped articles at the back of the bullet-trapping systems.

We have found that this object is achieved, surprisingly, by a projectile trap composition comprising 10% to 100% by weight of metallocene polyolefin wax and/or its derivatives. The projectile trap composition of the present invention has high permeability for projectiles with self-healing behavior and it effects the complete deceleration of impacting projectiles in a system of different plates and in some instances additionally a section of projectile trap composition granules.

The metallocene polyolefin waxes in the projectile trap composition of the present invention are by definition waxes produced from olefins, preferably from propylene, by polymerization in the presence of a metallocene catalyst. The synthesis of the metallocene polyolefin waxes can be carried out under a pressure of 0.1 to 10 MPa in the gas phase or in suspension or in solution in a suitable suspending/solvent medium in accordance with known technologies. The metallocene polyolefin waxes in the projectile trap composition of the present invention are not typical waxes, which are characterized by properties such as firm and brittle, coarsely to finely crystalline, translucent to opaque and kneadable at 20° C. By contrast, the metallocene polyolefin waxes in the projectile trap composition of the present invention have elastic, nonbrittle properties, have largely amorphous characteristics, and are transparent to translucent.

The projectile trap composition of the present invention surprisingly has excellent temperature properties which permit use in outdoor shooting ranges, particularly at low temperatures. The composition is also of high impact strength and toughness. The high intrinsic elasticity of the composition means that the projectiles are trapped without being significantly destroyed. This holds even for bullets having man-stopping power, which lead to appreciable damage in the front plate in the case of other projectile trap compositions which are not in accordance with the present invention.

Any release of noxants by deceleration taking place sufficiently slowly that the minimal heating effect does not cause any lead to become vaporized is avoided. Noxants released by munitions nonetheless, for example as a result of abrasion and/or fragmentation of the heavy metal projectiles, are physically held back by retention in the elastic material and by absorption in the composition softened by incoming projectiles, so that no noxants pass into the materials/air adjacent to the bullet-trapping system. The projectile trap composition of the present invention is therefore also notable for high environmental friendliness.

The heat evolved as a fired projectile enters causes the composition to melt in the immediate vicinity of the projectile, as a result of which the projectile tunnel reseals substantially automatically. Yet shaped articles composed of the projectile trap composition of the present invention retain their outer geometry and dimensional stability, since the melting only extends to the immediate vicinity of the fired pro-
jectile. The elasticity of the projectile trap composition of the present invention is such that ricochets, including ricochets in the direction of the shooter, can be avoided with almost complete certainty.

**0012** The projectile trap composition can be recycled by melting the material and separating the projectiles by sedimentation or/and filtration. The collected projectiles can thus be sent to a recycling operation for the heavy metals present. The cleaned/purified melt of the projectile trap compositions can then be recast in plates and used afresh as a projectile trap composition.

**0013** The metallocene polyolefin wax in the projectile trap composition of the present invention preferably has a drop point in the range between 70 and 160°C. The viscosity of the melt is in the range between 20 and 40 000 mPa·s at a temperature of 170°C.

**0014** Particularly advantageous properties were found when the metallocene polyolefin wax is a propylene wax.

**0015** In a preferred development of the invention, the metallocene polyolefin wax consists of a copolymer of propylene and ethylene which has a drop point in the temperature range between 80 and 130°C and a melt viscosity at 170°C in the range from 50 to 30 000 mPa·s.

**0016** In a preferred embodiment of the invention, the projectile trap composition comprises

**0017** a) metallocene polyolefin wax and/or derivatives thereof, preferably metallocene polypropylene wax,

**0018** b) optionally up to 90% by weight of a further wax or resin,

**0019** c) optionally up to 5% by weight of an antioxidant,

**0020** d) optionally up to 5% by weight of a light stabilizer,

**0021** e) optionally up to 50% by weight of a flame retardant,

**0022** f) optionally up to 50% by weight of a pulverulent filler which is insoluble in the metallocene polyolefin wax, and

**0023** g) optionally up to 10% by weight of a colorant, for example a pigment or a soluble dye.

**0024** The metallocene polyolefin waxes used are preferably homopolymers of propylene or copolymers of propylene with ethylene or with one or more 1-olefins. 1-Olefins used are preferably linear or branched olefins having 4 to 18 carbon atoms, more preferably 4 to 6 carbon atoms. Examples thereof are 1-butene, 1-hexene, 1-octene or 1-octadecene, and also styrene. In a particularly preferred embodiment of the invention, the metallocene polyolefin waxes are homopolymers of propylene. In a further particularly preferred embodiment of the invention, the metallocene polyolefin waxes are copolymers of propylene with ethylene. In the copolymers formed from propylene, preferably 70% to 99.9% by weight and more preferably 80% to 99% by weight of the structural units are derived from propylene.

**0025** Particularly useful metallocene polyolefin waxes have a drop point in the temperature range between 70 and 160°C, preferably between 80 and 130°C, a melt viscosity at 170°C between 20 and 40 000 mPa·s, preferably between 50 and 30 000 mPa·s and most preferably in the range from 100 to 7000 mPa·s, and a density at 160°C between 0.85 and 0.98 g/cm³ and preferably between 0.87 and 0.94 g/cm³. The metallocene polyolefin waxes in the projectile trap composition of the present invention have a minimum tensile strength of 4 N/mm² coupled with a strain at break of at least 10%. They are opaque or else translucent to transparent.

**0026** When the metallocene polyolefin waxes are not made into bullet-trapping systems, it is also possible to use intermediate articles such as plates, sheets, films, granules or profiles composed of the metallocene polyolefin waxes.

**0027** Metallocene catalysts for preparing the polyolefin waxes are chiral or nonchiral transition metal compounds of the formula M1Lx. The transition metal compound M1Lx comprises at least one central metal atom M1 to which at least one π-ligand, for example a cyclopentadienyl ligand, is attached. Substituents, for example halogen, alkyl, alkoxy or aryl groups, may additionally be attached to the central metal atom M1. M1 is preferably an element of main group III, IV, V or VI of the periodic table, such as Ti, Zr or Hf. Cyclopentadienyl ligand is to be understood as referring to unsubstituted cyclopentadienyl radicals and substituted cyclopentadienyl radicals such as methylcyclopentadienyl, indenyl, 2-methylindenyl, 2-methyl-4-phenylindenyl, tetrahydropyrenyl or octahydrothiorenyl radicals. The π-ligands can be bridged or unbridged, in which case simple and multiple bridging systems—including via ring systems—are possible. The term metallocene also comprises compounds having more than one metallocene fragment, known as multinuclear metallocenes. These may have any desired substitution patterns and bridging variants. The individual metallocene fragments of such multinuclear metallocenes can be of the same type or be different from one another. Examples of such multinuclear metallocenes are described in EP-632 063 for example.

**0028** Examples of general structural formulae of metallocenes and of their activation by means of a cocatalyst are given in EP-571 882 for instance.

**0029** Metallocene polyolefin waxes which have been modified to be polar are also useful for the projectile trap composition of the present invention.

**0030** Modification of metallocene polyolefin waxes can be accomplished by attaching organic or inorganic groups containing 0 to 500 carbon atoms and 0 to 200 heteroatoms, the heteroatoms comprising oxygen, phosphorus, sulfur, silicon, halogens and nitrogen in the form of tertiary nitrogen.

**0031** The polar modification of these metallocene polyolefin waxes can also be effected by oxidation with oxygen or oxygen-containing gases below or above the melting point. Preferably, the wax is oxidized in its molten state at temperatures between the melting point of the wax and 200°C by passing oxygen or oxygen-containing gases, preferably air, through the liquid melt. The waxes modified by oxidation have acid numbers between 0.1 and 100 mg KOH/g, preferably between 1 and 30 mg KOH/g, melt viscosities, measured at 170°C, in the range from 5 to 10 000 mPa·s and preferably in the range from 20 to 5000 mPa·s, and drop points in the temperature range from 80 to 160°C.

**0032** Derivatives of such oxides obtainable for instance by esterification of the oxides with mono- or polyhydric aliphatic or aromatic alcohols, for example ethanol, propanol, butanol, ethanediol, butanediols, glycerol, trimethylolpropane, pentaerythritol or benzyl alcohol, are also useful. Similarly, partial esters can be further derivatized, for instance by esterification with acid components such as acrylic acid or methacrylic acid.

**0033** A further way of effecting polar modification consists in reacting the metallocene polyolefin wax with alpha, beta-unsaturated carboxylic acids or derivatives thereof, in the presence or absence of a free-radical initiator. Examples of α,β-unsaturated carboxylic acids are acrylic acid, meth-
acrylic acid, crotonic acid and also maleic acid. Examples of derivatives of α,β-unsaturated carboxylic acids are their esters or amides/anhydrides, for example alkyl acrylates, acrylamides, mono- or diesters of maleic acid, maleic anhydride or amides of maleic acid such as maleimide or N-alkyl-substituted maleimides. Mixtures of these compounds can also be used. Maleic acid and its descendents are preferred and maleic anhydride is particularly preferred. The α,β-unsaturated carboxylic acids/derivatives thereof are used in an amount of 0.1% to 20% by weight, based on metallocene polyolefin wax used. The preparation of such free-radically produced polar reaction products is known and is described in EP 0 941 257 for example. The by reaction of metallocene polyolefin waxes with α,β-unsaturated carboxylic acids and derivatives thereof have melt viscosities, measured at 170°C in the range from 5 to 10 000 mPa.s preferably in the range from 10 to 5000 mPa.s, saponification numbers from 0.1 to 100 mg KOH/g, preferably 2 to 80 mg KOH/g, and drop points in the temperature range from 80 to 160°C, preferably in the range from 100 to 155°C.

[0034] In a preferred embodiment, the material in the projectile trap composition of the present invention consists exclusively of one or more metallocene polyolefin waxes and/or derivatives thereof.

[0035] In a further preferred embodiment, the material in the projectile trap composition of the present invention consists of one or more metallocene polyolefin waxes and/or derivatives thereof and further substances. When further substances are present in this material, the proportion of the entire material which is accounted for by one or more metallocene polyolefin waxes and/or derivatives thereof is preferably in the range from 0.1% to 100% by weight, more preferably in the range from 50% to 100% by weight and most preferably in the range from 80% to 100% by weight.

[0036] If necessary, the projectile trap composition may also comprise other waxes from the group consisting of natural waxes, partly synthetic waxes and wholly synthetic waxes. Suitable waxes have a melting point between 40 and 160°C, preferably 80 to 140°C, and a melt viscosity in the range from 20 to 10 000 mPa.s and preferably in the range from 20 to 6000 mPa.s. Preferred representatives of such waxes are carnuba waxes, candelilla waxes, beeswax, montan waxes, paraffins, polyolefin waxes prepared using Ziegler catalysts, and Fischer-Tropsch waxes.

[0037] When waxes other than metallocene polyolefin waxes or resins are included in the projectile trap composition of the present invention, they together comprise up to 90% by weight and preferably from 0% to 50% by weight of the total weight of the projectile trap composition.

[0038] Similarly, resins of natural or synthetic origin can be included in the metallocene polyolefin wax projectile trap composition. Suitable resins melt in the temperature range from 40 to 200°C and in the molten state have a melt viscosity of 10 up to 1000 mPa.s. Preferred representatives are hydrocarbon resins, resins based on olefinic acid, tree resins and also synthetic resins such as acrylic resins, ethylene-vinyl acetate resins, polycyclopentadiene resins and also water-soluble resins such as ethylene oxide adducts or polyvinyl alcohols.

[0039] The projectile trap composition may also comprise antioxidants. These are preferably selected from the group consisting of phenols and phosphorus compounds.

[0040] When antioxidants are included in the projectile trap composition, they comprise up to 10% by weight and preferably from 0.3% to 3% by weight of the entire projectile trap composition.

[0041] The projectile trap composition may also comprise light stabilizers. These are preferably selected from the group of hindered amine light stabilizers (HALSs).

[0042] When light stabilizers are included in the projectile trap composition, they comprise up to 10% by weight and preferably from 0.1% to 3% by weight of the entire projectile trap composition.

[0043] The projectile trap composition may also comprise flame retardants. When flame retardants are included in the projectile trap composition, they comprise up to 50% by weight and preferably from 5% to 25% by weight of the entire projectile trap composition.

[0044] The projectile trap composition may also comprise pulverulent fillers which are insoluble in the metallocene polyolefin wax. These are preferably selected from the group consisting of oxides, silicates, such as sand, silica and clays, carbonates, such as lime, and organic fillers having a decomposition temperature above 180°C and a melting point above 160°C such as for example wood meal, polystyrene, polymide and polytetrafluoroethylene (PTFE).

[0045] When such fillers are included in the projectile trap composition they comprise up to 50% by weight and preferably from 10% to 45% by weight of the entire projectile trap composition.

[0046] The projectile trap composition may also comprise colorants such as for example pigments or soluble dyes. These are preferably selected from the group consisting of organic and inorganic pigments and also oleo dyes.

[0047] When colorants are included in the projectile trap composition they comprise up to 5% by weight and preferably from 0.1% to 3% by weight of the entire projectile trap composition.

[0048] The examples which follow illustrate the invention.

EXAMPLES

[0049] Examples of metallocene polyolefin waxes which are advantageously useful in the projectile trap composition of the present invention:

Metallocene Polypropylene Waxes

[0050] TP Licocene® PP 1302 polypropylene wax (characterized by a melt viscosity of 200 mPa.s at 170°C and a drop point of about 90°C.)

TP Licocene® PP 1502 polypropylene wax (characterized by a melt viscosity of 1800 mPa.s at 170°C and a drop point of about 90°C.)

TP Licocene® PP 1602 polypropylene wax (characterized by a melt viscosity of 7000 mPa.s at 170°C and a drop point of about 90°C.)

TP Licocene® PP 2602 polypropylene wax (characterized by a melt viscosity of 6000 mPa.s at 170°C and a drop point of about 100°C.)

TP Licocene® PP 3502 polypropylene wax (characterized by a melt viscosity of 1800 mPa.s at 170°C and a drop point of about 110°C.)

TP Licocene® PP MA 1332 maleic anhydride grafted polypropylene wax (characterized by a melt viscosity of 300 mPa.s at 170°C and a drop point of about 85°C and an acid number of 18 mg KOH/g.)
The aforementioned waxes are manufactured by Clariant Produkte Deutschland GmbH.

Example 1

A projectile trap composition was prepared by casting plates of TP Licocene® PP 1602. Plate dimensions were about 70x70x5 cm.

The material is characterized by a melt viscosity of 7000 mPa·s at 170 °C and a drop point of about 90 °C.

The shaped projectile trap composition articles obtained exhibit the expected good impact strength and toughness when tested as pure material and without admixture with other materials.

Mechanical tests on standardized test specimens gave the following measurements:

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Measurement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 527 tensile modulus of elasticity</td>
<td>50 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 stress at yield</td>
<td>4 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 strain at yield</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>ISO 527 stress at break</td>
<td>4 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 strain at break</td>
<td>62%</td>
<td></td>
</tr>
<tr>
<td>Ball compression hardness (10 kg, 5 mm, 5 min)</td>
<td>5 MPa</td>
<td></td>
</tr>
<tr>
<td>Flow hardness</td>
<td>510 bar</td>
<td></td>
</tr>
<tr>
<td>Shore hardness (ISO 868)</td>
<td>D 25</td>
<td></td>
</tr>
</tbody>
</table>

Example 2

A projectile trap composition was prepared by casting plates of TP Licocene® PP 2602. Plate dimensions were about 70x70x5 cm.

The material is characterized by a melt viscosity of 6000 mPa·s at 170 °C and a drop point of about 100 °C.

The shaped projectile trap composition articles obtained exhibit the expected good impact strength and toughness when tested as pure material and without admixture with other materials.

Mechanical tests on standardized test specimens gave the following measurements:

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Measurement</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 527 tensile modulus of elasticity</td>
<td>150 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 stress at yield</td>
<td>8 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 strain at yield</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>ISO 527 stress at break</td>
<td>9 MPa</td>
<td></td>
</tr>
<tr>
<td>ISO 527 strain at break</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>Ball compression hardness (10 kg, 5 mm, 5 min)</td>
<td>9 MPa</td>
<td></td>
</tr>
<tr>
<td>Flow hardness</td>
<td>970 bar</td>
<td></td>
</tr>
<tr>
<td>Shore hardness (ISO 868)</td>
<td>D 40</td>
<td></td>
</tr>
</tbody>
</table>

Example 3

A projectile trap composition was prepared by casting plates of TP Licocene® PP 1502. Plate dimensions were about 70x70x5 cm.

The material is characterized by a melt viscosity of 1800 mPa·s at 170 °C and a drop point of about 90 °C.

The shaped projectile trap composition articles obtained exhibit good impact strength and toughness.

Example 4

A multilayered bullet-trapping construction was prepared to consist of plates of differently decelerating Licocene® types, for example Licocene® PP 1502 and Licocene® PP 1602.

Example 5

A bullet-trapping construction was prepared similarly to Example 4 using Licocene® granules between two Licocene® plates about 5 to 6 cm in thickness in order that suitable bullet-trapping systems may be tested for various calibers over a variable length of the deceleration section. A Licocene® PP 1602 plate was followed by a 20 to 50 cm length of a packing composed of Licocene® PP 1602 granules.

Example 6

A bullet-trapping construction utilizing one to two Licocene® PP 1602 plates 6 cm in thickness was used similarly to Example 4 to decelerate impacting projectiles. The back disk of the system was a Licocene® PP 1502 plate 6 cm in thickness, the rear side of which was backstopped with a piece of sheet steel. The intention with this was to ensure that any left-over kinetic energy is absorbed, and final deceleration of the projectiles within the bullet-trapping construction is achieved, even when very different calibers are used.

Example 7

After the bullet-trapping construction has been loaded with many projectiles as a result of shooting, the material is recycled by separating the granules from the projectile material by slurring in water. In the process, the Licocene® floats away on the water, since it has a lower...
density than water. The projectiles settle out and are separated off and are similarly sent for recycling. The Licocene® is either used again as granules.

Example 8
[0072] After the bullet-trapping construction has been loaded with many projectiles as a result of shooting, the material is recycled by melting the plates and the granules, unless separated off as described in Example 6, and separating off the projectiles by filtration. The projectiles are thus separated off and sent for recycling. The molten Licocene® is recast into plates or granulated and can thus be used again for constructing the bullet trap.

1. A projectile trap composition for trapping fired projectiles, comprising 10% to 100% by weight of a metalloocene polyolefin wax, based on the total weight of the projectile trap composition.

2. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is a homopolymer of propylene or a copolymer of propylene with ethylene or with one or more 1-olefins having 4 to 18 carbon atoms.

3. The projectile trap composition as claimed in claim 1, further comprising from 0% to 90% by weight of an additive, auxiliary material or mixture thereof.

4. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is present in an amount ranging from 90% to 100% by weight.

5. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax has a drop point in the temperature range between 80 and 150°C and a melt viscosity in the range from 20 to 40 000 mPa·s, measured at 170°C.

6. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax has a drop point in the temperature range between 85 and 115°C and a melt viscosity in the range from 100 to 7000 mPa·s, measured at 170°C.

7. The projectile trap composition as claimed in claim 1, further comprising other waxes, resins, antioxidants, light stabilizers, flame retardants, fillers, pigments or dyes.

8. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is at least partially functionalized.

9. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is at least partially grafted with maleic anhydride.

10. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is at least partially crosslinked via functional groups.

11. A front disk in bullet-trapping system or a safety construction against ricochets, including ricochets in the direction of the shooter comprising a projectile trap composition as claimed in claim 1.

12. A trapping material for fired projectiles which has improved ability to retain harmful materials comprising a projectile trap composition as claimed in claim 1.

13. A material for completely stopping fired projectiles in the rearward region of bullet-trapping system comprising a projectile trap composition as claimed in claim 1.

14. A method of recycling a projectile trap composition as claimed in claim 1, comprising the step of separating the projectile trap composition being from a decelerated projectile by slurrying in water or by melting and filtering.

15. The projectile trap composition as claimed in claim 1, wherein the metalloocene polyolefin wax is at least partially functionalized by oxidation or by functionalization with alpha,beta-unsaturated carboxylic acids.

* * * * *