PATENT CLAIMS

1. A process (100) for preparing a processed filament (410), the process (100) comprising as process steps

   a) providing a filament (201), which comprises a multitude of segments (204), which follow one another in a longitudinal direction (401) of the filament (201),
   wherein each of the segments (204) of the multitude of segments (204) comprises a multitude of sections (202, 203), which are disposed circumferentially around the filament (201); and

   b) processing the filament (201) in n processing steps (103, 104, 701, 702), thereby obtaining the processed filament (410);

   wherein for each integer i in the range from 1 to n, the i^{th} processing step comprises, for each integer j in the range from 1 to m, processing the j^{th} section of the $(i+j-1)^{th}$ segment;

   wherein n and m are integers which are, independent from one another, at least 2;

   wherein sections (202, 203) of different number are at different circumferential locations of the filament (201);

   wherein the processing of each section (202, 203) of each segment (204) of the filament (201) comprises an interaction of the section (202, 203) of the segment (204) of the filament (201) with at least one processing beam (301).

2. The process (100) according to claim 1, wherein, in each i^{th} processing step, the processing of the 1^{st} to m^{th} sections is conducted at least in temporal overlap with one another.

3. The process (100) according to claim 1 or 2, wherein n equals m.

4. The process (100) according to any of the preceding claims, wherein the sum of the surface areas of the sections (202, 203) of a segment (204), which are processed in the process step b) (102), equals the surface area of an outer surface of this segment (204).

5. The process (100) according to any of the preceding claims, wherein n or m or each of both is at least 3.

6. The process (100) according to any of the preceding claims, wherein between each of two consecutive processing steps (103, 104, 701, 702) the filament (201) is moved in a direction of its length.

7. The process (100) according to any of the preceding claims, wherein the processing in the processing steps (103, 104, 701, 702) is a subtractive process.

8. The process (100) according to any of the preceding claims, wherein the filament (201) is one selected from the group consisting of a wire, a cable, and a fibre, or a combination of at least two thereof.

9. The process (100) according to any of the preceding claims, wherein the at least one processing beam (301) is at least one laser beam.

10. A processed filament (410), obtainable by the process (100) according to any of the preceding claims.

11. A filament (2000), according to the invention, wherein the filament (2000) comprises
    a. a core (1201), comprising a first metal,
    b. a first layer (1202) which
        i. is superimposed on the core (1201), and
        ii. comprises a polymer, and
    c. a second layer (1203) which

i. is superimposed on the first layer (1202), and

ii. comprises a second metal;

wherein the filament (2000) comprises p segments (2001 to 2004) which follow one another in a longitudinal direction (410) of the filament (2000);

wherein the p segments (2001 to 2004) are numbered from 1 to p in the longitudinal direction (401);

wherein each of the p segments (2001 to 2004) comprises p sections which are disposed circumferentially around the filament (2000);

wherein p is an integer which is at least 3;

wherein for each integer k in the range from 1 to p the k^{th} segment comprises exactly (p – [k – 1]) sections (2005) which have been processed;

wherein in each section (2005) that has been processed

a] a thickness of the second layer (1203) is less than outside the sections (2005) which have been processed, or

b] the second layer (1203) has been removed.

12. An electrical device (1600), comprising at least a part of the processed filament (410) according to claim 10 or of the filament (2000) according to claim 11.

13. A device (1400) for preparing a processed filament (410) in a process stream (1409), the device (1400) comprising, as components,

a) a first processing beam source (1404), which designed and arranged to emit a first processing beam onto a first segment of a filament (201) for processing the filament (201) by interaction of the first processing beam with the first segment; and

b) a further processing beam source (1405), which designed and arranged to emit a further processing beam onto a further segment of the filament (201) for processing the filament (201) by interaction of the further processing beam with the further segment;

wherein the first segment and the further segment follow one another in a longitudinal direction (401) of the filament (201);

wherein the device (1400) is designed and arranged for conducting the process (100) according to any of the claims 1 to 9.

14. The device (1400) according to claim 13, wherein the first processing beam source (1404) is designed and arranged to emit the first processing beam onto a first section of the first segment of the filament (201) for processing the filament (201) by interaction of the first processing beam with the first section of the first segment,

wherein the further processing beam source (1405) is designed and arranged to emit the further processing beam onto a further section of the further segment of the filament (201) for processing the filament (201) by interaction of the further processing beam with the further section of the further segment,

wherein the first section and the further section are at different circumferential locations around the filament (201).

15. A device (1400) for preparing a processed filament (410) in a process stream (1409), the device (1400) comprising as components

a) a first processing beam source (1404), and

b) a processing beam distribution element,

wherein the first processing beam source (1404) is designed and arranged

a. to provide a first processing beam via the processing beam distribution element onto a first segment of a filament (201) for processing the filament (201) by interaction of the first processing beam with the first segment, and

b. to provide a further processing beam via the processing beam distribution element onto a further segment of the filament (201) for processing the filament (201) by interaction of the further processing beam with the further segment,

wherein the first segment and the further segment follow one another in a longitudinal direction (401) of the filament (201).

16. The device (1400) according to claim 15, wherein the first processing beam source (1404) is designed and arranged

a] to provide the first processing beam via the processing beam distribution element onto a first section of the first segment of the filament (201) for processing the filament (201) by interaction of the first processing beam with the first section of the first segment, and

b] to provide the further processing beam via the processing beam distribution element onto a further section of the further segment of the filament (201) for processing the filament (201) by interaction of the further processing beam with the further section of the further segment,

wherein the first section and the further section are at different circumferential locations around the filament (201).

17. A use of at least one laser for providing the at least one processing beam (301) in the process (100) according to any of the claims 1 to 9, or as the first processing beam source of the device (1400) according to any of the claims 13 to 16.

18. A use of a filament (201) for being processed in the process (100) according any of the claims 1 to 9, or by the device (1400) according to any of the claims 13 to 16, in each case, thereby obtaining the processed filament (410) from the filament (201).