A midsole has a hard portion and at least one soft portion. The hard portion of the midsole can support the shoe into a predetermined shape and the soft portion of the midsole will provide a bendable capacity for facilitating walking. The midsole is made by double tube injection molding method. Thus, the material capacity of the portion of the hard portion connecting with the soft portion will change gradually from the hard portion to the soft portion to provide a strong structure of the midsole.
MIDSOLE HAVING HARD PORTION AND SOFT PORTION

FIELD OF THE INVENTION

[0001] The present invention relates generally to a midsole for shoes, and more particularly to a midsole having hard portion and soft portion.

BACKGROUND OF THE INVENTION

[0002] In the present marks, most of the midsoles have a homogeneous hardness material capacity. In analysis of the step studies, the feet will bend while walking. Thus, the midsole should provide a soft and bendable capacity for facilitating walking. But a softer midsole is hard to support the sole of a shoe into a predetermined shape. However, according to the above discussing, a harder midsole is not facilitating walking. It is hard to choose the hardness of the midsoles by manufacturers.

[0003] Although there were conventional midsole which were made of fiber material attaching with soft material, such as foam, EVA (ethylene/vinyl acetate) or PU. (Polyurethane) such midsoles will easy to be damage or to be deformed after a long time use. Most of all, the process of manufacturing the midsole will cause pollution of environment. So, there is no fine solution for manufacturing midsoles today.

SUMMARY OF THE INVENTION

[0004] The primary objective of the invention is to provide a midsole having hard portion and soft portion, which the hard portion of the midsole will support the shoe into a predetermined shape and the soft portion of the midsole will provide a bendable portion for facilitating walking.

[0005] According to the objective described above, the midsole of the present invention has a hard portion and at least one soft portion. The hard portion of the midsole will support the shoe into a predetermined shape and the soft portion of the midsole will provide a bendable capacity for facilitating walking. The midsole is made by double injection molding method. Thus, the material capacity of the portion of the hard portion connecting with the soft portion will change gradually from the hard portion to the soft portion to provide a strong structure of the midsole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 shows a topside view of the first prefer embodiment of present invention;
[0007] FIG. 2 shows a topside view of the second prefer embodiment of present invention;
[0008] FIG. 3 shows a topside view of the third prefer embodiment of present invention;
[0009] FIG. 4 shows a topside view of the fourth prefer embodiment of present invention
[0010] FIG. 5 shows a topside view of the fifth prefer embodiment of present invention, and

DETAIL DESCRIPTION OF THE INVENTION

[0011] The midsole of the present invention is molded by double tube injection molding method. The molding materials can choose from TPR, (Thermoplastic rubber) PU, PE or PP composite materials. Manufacturers can pick one type of composite material but with different components to be a soft molding material and a hard molding material respectively, such as softer TPR and harder TPR, or just simply pick two types of composite materials with different hardness material capacities, such as TPR and PP, to process the double tube injection molding. The molding process also can be done by pick three or more types of composite materials.

[0012] The double tube injection molding will mold a midsole having a hard portion and at least one soft portion in one step. The hard portion of the midsole is difficult to be deformed and the soft portion of the midsole has a bendable capacity.

[0013] The reason of molding the midsole of the present invention by double tube injection molding method is that there will be no significant boundary between the hard portion and the soft portion. The material capacity of the portion of the hard portion connecting with the soft portion will change gradually from the hard portion to the soft portion. That provides a strong strength at the portion of the hard portion connecting with the soft portion. Thus, the midsole of the present invention will not easy to damage after a long time use.

[0014] Please refer to FIG. 1, the first prefer embodiment of the present invention provides a midsole 10, which pick the softer TPR composite material to be the soft molding material to mold a soft portion 11 and pick the harder TPR composite material to be the hard molding material to mold a hard portion 12. The soft portion 11 locates at the front side of the midsole 10, in which the soft portion 11 is corresponding to the joint and the toes of foot, to provide a bendable capacity for facilitating walking. The hard portion 12 locates at the rear side of the midsole 10, in which the hard portion 12 is corresponding to the arch and the heel of foot, for supporting the sole of shoe (not shown) into a predetermined shape.

[0015] Please refer to FIG. 2, the midsole 20 of the second prefer embodiment is picking the TPR composite material and the PP composite material to mold two soft portions 21 and a hard portion 22. One of the soft portions 21 locates at the front side of the midsole 10, in which the soft portion 11 is corresponding to the joint and the toes of foot, the other soft portion 21 locates at the rear side of the midsole 10, in which the hard portion 21 is corresponding to the heel of foot. The hard portion 22 locates at the midsection of the midsole 20, in which the hard portion 22 is corresponding to the arch of foot.

[0016] Please refer to FIG. 3, the midsole 30 of the third prefer embodiment of the present invention has a soft portion 31 at the front side thereof corresponding to the toes and the joint of foot and a hard portion 32 at the rear side thereof. At the central portion of the hard portion 32 further provides a soft portion 31 corresponding to the heel of foot to provide the heel a comfortable touch and provides a capacity of absorbing impact when walking.

[0017] The midsole 40 of the fourth embodiment of the present invention, as shown in FIG. 4, is mainly made of a hard portion 41. Two soft portions 42 provide at the front side and the rear side of the midsole 40 corresponding to the joint and the heel of foot.
[0018] The FIG. 5 shows the fifth embodiment of the present invention. The central portion of the midsole has a hard portion 50. A soft portion 51 provides around at the outer side of the hard portion 50 for facilitating the midsole sewing on a shoe. The FIG. 6 shows the midsole sewing on a shoe with the X signs represent the sewing position.

What is claimed is

1. A midsole has a shape substantially corresponding to a sole of a shoe, which comprises a hard portion and at least one soft portion; said midsole being molded by double tube injection molding method with a hard molding material and a soft molding material; the hard molding material and the soft molding material are picked from one type of material but having different hardness material capacities; said hard portion of said midsole being molded by said hard molding material to have a harder capacity; said soft portion of said midsole being molded by the soft molding material to have a softer and bendable capacity; the material capacity of the portion of said hard portion connecting with said soft portion is changing gradually from said hard portion to said soft portion.

2. According to the midsole as defined in claim 1, wherein said soft portion locating at the front side of said midsole corresponding to the toes and the joint of foot; said hard portion locating at the rear side of said midsole corresponding to the arch and the heel of foot.

3. According to the midsole as defined in claim 1, wherein comprising tow of said soft portions, one of which locating at the front side of said midsole corresponding to the toes and the joint of foot, the other locating at the rear side of said midsole corresponding to the heel of foot; said hard portion locating at the midsection of said midsole corresponding to the arch of foot.

4. According to the midsole as defined in claim 1, wherein said midsole being mainly made of said hard portion; two of said soft portions providing at the front side and the rear side of said midsole corresponding to the joint and the heel of foot respectively.

5. According to the midsole as defined in claim 1, wherein said hard portion locating at the central portion of said midsole; said soft portion locating around at the outer side of said hard portion.

6. A midsole has a shape substantially corresponding to a sole of a shoe, which comprises a hard portion and at least one soft portion; said midsole being molded by double tube injection molding method with a hard molding material and a soft molding material; the hard molding material and the soft molding material are picked from two types of materials having different hardness material capacities; said hard portion of said midsole being molded by said hard molding material to have a harder capacity; said soft portion of said midsole being molded by the soft molding material to have a softer and bendable capacity; the material capacity of the portion of said hard portion connecting with said soft portion is changing gradually from said hard portion to said soft portion.

7. According to the midsole as defined in claim 6, wherein said soft portion locating at the front side of said midsole corresponding to the toes and the joint of foot; said hard portion locating at the rear side of said midsole corresponding to the arch and the heel of foot.

8. According to the midsole as defined in claim 6, wherein comprising tow of said soft portions, one of which locating at the front side of said midsole corresponding to the toes and the joint of foot, the other locating at the rear side of said midsole corresponding to the heel of foot; said hard portion locating at the midsection of said midsole corresponding to the arch of foot.

9. According to the midsole as defined in claim 6, wherein said midsole being mainly made of said hard portion; two of said soft portions providing at the front side and the rear side of said midsole corresponding to the joint and the heel of foot respectively.

10. According to the midsole as defined in claim 6, wherein said hard portion locating at the central portion of said midsole; said soft portion locating around at the outer side of said hard portion.

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