EP 1 873 200 A1 discloses different plasticizers for aliphatic polyamides, including p-alkyl benzene sulfonamides and guanidine-based compounds.

WO 2010/137725 A1 relates to a polyamide resin composition which is obtained by incorporating into a polyamide resin: an inorganic filler which has been surface-treated with an organopolysiloxane and in which the ratio of the amount of the organopolysiloxane used for the treatment to the specific surface area is in a specific range (A); and a polyalkylene glycol (B) having a number average molecular weight of 200 or more and 4,000 or less and/or a partial ester compound of a fatty acid with an alkylene oxide adduct of a polyhydric alcohol (C).

CN 107760022 A relates to a plasticized toughened nylon 6 material comprising, by mass, 73.6-84.5% of nylon 6, 10-15% of a toughening agent, 10-15% of a plasticizer, 0.2-0.6% of a heat stabilizer and 0.3-0.8% of a lubricant. The toughening agent is a maleic anhydride grafted polyolefin toughening agent, the plasticizer is a mixture of lactam compounds and polyethylene glycol, the thermal stabilizer is a mixture of a phenolic antioxidant and a thioester antioxidant, and the lubricant is montan wax. Based on the traditional toughened nylon 6, a third component plasticizer is used so that the plasticized toughened nylon 6 material greatly reduces the percentage of the toughening agent, retains high toughness of the nylon 6 material, greatly improves the flowability of the nylon 6 material and widens an application range of the nylon 6 material.

US 2015/051329 A1 relates to a polymer composition, comprising an effective amount of plasticizer in polyamide base polymer, wherein the plasticizer comprises an aromatic ester of poly(trimethylene ether) glycol with a number average molecular weight of 1000 or less.

Most of the above-mentioned compounds are toxic, for example benzene sulfonamide. Lactams like caprolactam lead to significant emissions during the processing of the molding composition and from the final molded parts.

The object underlying the present invention is to provide a plasticizer for polyamides which has high plasticizing efficiency, low migration in the polyamide and is not problematic with regard to the GHS (Globally Harmonized System of Classification and Labelling of Chemicals) rating.

Summary

In an aspect of the present disclosure, there is provided a thermoplastic molding composition, comprising

a) 39.9 to 99.9 wt% of at least one thermoplastic polyamide

as component A,

b) 0.1 to 10 wt% of at least one plasticizer of the general formula (1)

$$R_1\text{-}O\text{-}(CH_2CH_2\text{-}O\text{-})_nR_2 \qquad (1)$$

with n = 1 to 4

R_1, R_2 independently H, C_{1-12}-alkyl, phenyl or tolyl,
having a boiling point of more than 250 °C, as component B,
c) 0 to 45 wt% of at least one elastomeric polymer as component C,
d) 0 to 60 wt% of at least one fibrous and/or particulate filler as component D,
e) 0 to 25 wt% of further additives as component E,
wherein the total of wt% of components A to E is 100 wt%.

In another aspect, there is provided a process for preparing the thermoplastic molding composition as defined above by mixing the components A to E.

In another aspect, there is provided the use of the thermoplastic molding composition as defined above for producing fibers, foils and moldings of any type.

In another aspect, there is provided a fiber, foil or molding, made of the thermoplastic molding composition as defined above.

In another aspect, there is provided the use of a compound of the general formula (1)

$$R_1\text{-O-}(CH_2CH_2\text{-O-})_nR_2 \qquad (1)$$

with n = 1 to 4
R_1, R_2 independently H, C_{1-12}-alkyl, phenyl or tolyl,
having a boiling point of more than 250 °C as plasticizer for thermoplastic polyamides.

The object is achieved according to the present invention by a thermoplastic molding composition, comprising

a) 39.9 to 99.9 wt% of at least one thermoplastic polyamide
as component A,
b) 0.1 to 10 wt% of at least one plasticizer of the general formula (1)

$$R_1\text{-O-}(CH_2CH_2\text{-O-})_nR_2 \qquad (1)$$

with n = 1 to 10
R_1, R_2 independently H, C_{1-12}-alkyl, phenyl or tolyl,
having a boiling point of more than 250 °C, as component B,