It has been found that, surprisingly, the use of higher amounts of at least one cyclic diamine than described in EP 0 667 367 A2 achieves copolyamides with significantly higher glass transition temperatures, combined with high crystallinity and equally high melting point. The copolyamides thus obtained are thus processible at the same temperatures, but feature better mechanical properties at high temperatures. This is especially true when the amine component of the copolyamides comprises isophoronediamine or consists of isophoronediamine.

SUMMARY

The disclosure firstly provides a semiaromatic copolyamide PA) comprising in copolymerized form:

a) 36 to 50 mol% of terephthalic acid,
b) 0 to 14 mol% of isophthalic acid,
c) 35 to 42.5 mol% of hexamethylenediamine,
d) 7.5 to 15 mol% of at least one cyclic diamine,

where components a) to d) together add up to 100 mol%.

The disclosure further provides polyamide molding compositions comprising a semiaromatic copolyamide as defined above and hereinafter.

The disclosure further provides for the use of a semiaromatic copolyamide for production of polyamide molding compositions which serve especially for production of components for high-temperature automotive applications and the electrical/electronics sector.

In an aspect, there is provided a semiaromatic copolyamide PA) comprising, in copolymerized form:

a) 36 to 50 mol% of terephthalic acid,
b) more than 0 to 14 mol% of isophthalic acid,
c) 35 to 42.5 mol% of hexamethylenediamine,
d) 7.5 to 15 mol% of at least one cyclic diamine, where the cyclic diamine d) comprises isophoronediamine or consists of isophoronediamine,

where components a) to d) together add up to 100 mol%.

In another aspect, there is provided a polyamide molding composition comprising at least one copolyamide as defined above.

In another aspect, there is provided a molding produced from a polyamide molding composition as defined above.

In another aspect, there is provided the use of a semiaromatic copolyamide as defined above or of a molding composition as defined above for production of electrical and electronic components and for high-temperature automotive applications.

DESCRIPTION

The glass transition temperatures (Tg), melting temperatures (Tm) and heat, of fusion (ΔH) described in the context of this application can be determined by means of differential scanning calorimetry (DSC). The determination can be effected in a manner known per se (DIN EN ISO 11357, Parts 1 to 3). The index (2) for enthalpy of fusion ΔH_2, glass transition temperature T_{g2} and melting temperature T_{m2} means that the second measurement is concerned (1st repetition), meaning that the sample of the copolyamide PA is conditioned by the performance of a first DSC analysis in which the sample is heated to melting temperature. The determination is effected under nitrogen in open crucibles at a heating rate in the region of about 20 K/min.