

Title (en)  
Sliding part coated with triboactive oxides having a deficiency of metal cations

Title (de)  
Gleitteil beschichtet mit Metall-Kationarmen, triboaktiven Oxiden

Title (fr)  
Pièce mécanique de friction recouverte d'oxydes triboactifs présentant un défaut de cations métalliques

Publication  
**EP 1061153 A1 20001220 (FR)**

Application  
**EP 00401715 A 20000616**

Priority  
FR 9907630 A 19990616

Abstract (en)  
The friction part is coated on part or on the whole of its surface with a layer comprising at least a metal oxide having a stoichiometric deficiency of metal cations and selected from  $\text{Co}_{1-y}\text{O}$ ,  $\text{Cr}_2\text{-yO}$ ,  $\text{Fe}_3\text{-yO}_4$  and  $\text{Mn}_{1-y}\text{O}$ , where  $y$  is greater than 0.00001 and less than 0.15. Preferably,  $y = 0.0001\text{-}0.01$  for  $\text{Co}_{1-y}\text{O}$  and  $\text{Cr}_2\text{-yO}$ ;  $y = 0.001\text{-}0.03$  for  $\text{Fe}_3\text{-yO}_4$ ; and  $y = 0.00001\text{-}0.1$  for  $\text{Mn}_{1-y}\text{O}$ . The metal oxide layer is preferably homogeneous and has thickness of 5-1000 microns, preferably 10-200 microns. The layer containing the metal oxide can comprise a metal or ceramic matrix of thickness 5-1000 microns, preferably 10-100 microns, and containing 5-70 weight %, preferably 10-40 weight %, tribo-active particles of at least one metal oxide having a deficiency of metal cations. Preferably, the tribo-active particles have mean size of 0.3-30 microns, more preferably 0.5-5 microns. Matrix metal is selected from iron, nickel, nickel-phosphorus, chromium, cobalt, tungsten, molybdenum, and alloy of these metals, iron-aluminum, brass (CuZn) or bronze (CuSn). Matrix ceramic is selected from  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{Cr}_2\text{O}_3$ ,  $\text{TiO}_2$  or a mixture of these ceramics. Independent claims are given for: (a) a friction part concerning a cam following, a camshaft, a piston pin, a piston ring, a cylinder liner, a valve guide, a valve rod, a synchronizing cone, or an oil pump gear; and (b) production of the friction part by thermal spraying of powders of the components of the layer on the base of the friction part, or electroplating for composites having a metal matrix of nickel, nickel-phosphorus or chromium.

IPC 1-7  
**C23C 4/10**; **C23C 4/06**

IPC 8 full level  
**C23C 4/06** (2006.01); **C23C 4/10** (2006.01); **C23C 30/00** (2006.01)

CPC (source: EP)  
**C23C 4/06** (2013.01); **C23C 4/11** (2016.01); **C23C 30/00** (2013.01); **F05C 2201/021** (2013.01); **F05C 2203/04** (2013.01)

Citation (search report)  
• [A] WO 9713884 A1 19970417 - FORD MOTOR CO [GB], et al  
• [A] DE 19548718 C1 19970528 - DAIMLER BENZ AG [DE]  
• [A] DE 19651094 A1 19980610 - MAN TECHNOLOGIE GMBH [DE]

Cited by  
US6726216B2; US8020529B2; GB2367074A; GB2367074B; DE102015209887A1; US7445763B2

Designated contracting state (EPC)  
BE DE ES GB

DOCDB simple family (publication)  
**EP 1061153 A1 20001220**; FR 2795095 A1 20001222; FR 2795095 B1 20020412

DOCDB simple family (application)  
**EP 00401715 A 20000616**; FR 9907630 A 19990616