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Parametric Finite Element Analysis of Thermal-Structure Couple on Seal Ring

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Abstract: The hyperelasticity theory and heat transfer principle were applied to the coupled field simulation of thermal and structure of O-ring with block ring by finite element analysis. The effect of working parameters on seal performance was studied. The results showed that the largest deformation appeared at bottom part and contact position with cylinder wall, the biggest Mises stress occurred at bottom part. The shear stress and maximum contact pressure increased significantly with the increase of medium pressure. The frictional and mechanical hysteresis led to high temperature field in seal ring. The temperature rise of seal ring evidently increased when medium pressure, relative slide speed and medium temperature increased. The parametric simulation system of seal ring was then developed based on ANSYS/MATLAB which was efficient and effective for the analysis of different type and dimension of O-ring seals under various working conditions.

Key words: seal ring; temperature field; thermal-structure couple; finite element analysis; parametric model

一种电容器专用丁腈橡胶 密封垫及其制备方法

中图分类号:TQ336.4+2;TQ333.7 文献标志码:D

由安徽江威精密制造有限公司申请的专利(公开号 CN 103627049A, 公开日期 2014-03-12)“一种电容器专用丁腈橡胶密封垫及其制备方法”,涉及的密封垫配方为:丁腈橡胶(NBR) 74~78,软木颗粒 6~8,炭黑 N330 43~46,改性凹凸棒土 12~15,磷酸二氢锌 5~7,硼酸锌 3~4,焦磷酸锌 12~15,防老剂 RD 1~2,防老剂 MB 1~2,2-巯基苯并咪唑 1~2,甲基三甲氧基硅烷 1~3,硫黄 1~2,促进剂 M 1~2. 该密封垫采用 NBR 制成,具有良好的耐油性,且耐高低温性能好,使用寿命长,成本低。

(本刊编辑部 赵 敏)

制备丁基橡胶溶液的方法及其应用

中图分类号:TQ336.1+1 文献标志码:D

由中国石油化工股份有限公司和中国石油化工股份有限公司北京化工研究院申请的专利(公开号 CN 103665229A, 公开日期 2014-03-26)“制备丁基橡胶溶液的方法及其应用”,提供了一种制备丁基橡胶(IIR)溶液的方法,包括:(a)将 IIR 胶粒水混合物通过振动筛脱水;(b)将脱水后的胶粒水混合物溶解在烷烃和/或环烷烃中得到含水胶液;(c)将含水胶液先通过重力沉降脱水进行一级脱水、再通过电脱水进行二级脱水得到水质量分数小于 0.003 的 IIR 溶液。该方法还可用于卤化丁基橡胶生产中。与现有 IIR 溶胶工艺相比,该发明不仅设备投资低,而且溶胶效果好。

(本刊编辑部 赵 敏)